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Western Mining in the Twentieth Century Oral History Series

Warren E. Fenzi

JUNIOR ENGINEER TO PRESIDENT, DIRECTOR OF PHELPS DODGE, 1937 TO 1983

Introduction by
Arthur H. Kinneberg

Interview Conducted by
Eleanor Swent
in 1995

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Warren E. Fenzi, *Junior Engineer to President, Director of Phelps Dodge, 1937 to 1983*, an oral history conducted in 1995 by Eleanor Swent, Regional Oral History Office, The Bancroft Library, University of California, Berkeley, 1996.

Copy no. /



Warren E. Fenzi, March 1975

Cataloguing information

FENZI, WARREN (b. 1915)

Civil engineer, mining executive

Junior Engineer to President, Director of Phelps Dodge, 1937 to 1983, 1996, xiii, 172 pp.

Warren and Fenzi family histories; Dodge family; Santa Barbara boyhood; Cal Tech, 1933-1937; Japanese students; Phelps Dodge, 1937-1942: Recession cutbacks, scrap iron to Japan, open-pit mining equipment and training, explosives experiments; company-provided benefits, labor relations; WWII demand for copper, increased production, service in Seabees; mine superintendent to president, Phelps Dodge, 1946-1983: Korean War production, Tyrone, NM, flash smelter, solvent extraction, Toquepala (Peru) Mine, Arizona politics, labor relations, 1983 strike, environmental protection compliance, 1973 oil crisis, uranium and acquisition of Western Nuclear Corp., director, St. Joe Lead Company, Southern Peru Copper Co.

Introduction by Arthur Kinneberg, retired senior vice president and director, Phelps Dodge.

Interviewed 1995 by Eleanor Swent for Western Mining in the Twentieth Century Oral History Series. Regional Oral History Office, The Bancroft Library, University of California, Berkeley.

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PREFACE

The oral history series on Western Mining in the Twentieth Century documents the lives of leaders in mining, metallurgy, geology, education in the earth and materials sciences, mining law, and the pertinent government bodies. The field includes metal, non-metal, and industrial minerals. In its tenth year the series numbers thirty-five volumes completed and others in process.

Mining has changed greatly in this century: in the technology and technical education; in the organization of corporations; in the perception of the national strategic importance of minerals; in the labor movement; and in consideration of health and environmental effects of mining.

The idea of an oral history series to document these developments in twentieth century mining had been on the drawing board of the Regional Oral History Office for more than twenty years. The project finally got underway on January 25, 1986, when Mrs. Willa Baum, Mr. and Mrs. Philip Bradley, Professor and Mrs. Douglas Fuerstenau, Mr. and Mrs. Clifford Heimbucher, Mrs. Donald McLaughlin, and Mr. and Mrs. Langan Swent met at the Swent home to plan the project, and Professor Fuerstenau agreed to serve as Principal Investigator.

An advisory committee was selected which included representatives from the materials science and mineral engineering faculty and a professor of history of science at the University of California at Berkeley; a professor emeritus of history from the California Institute of Technology; and executives of mining companies. Langan Swent delighted in referring to himself as "technical advisor" to the series. He abetted the project from the beginning, directly with his wise counsel and store of information, and indirectly by his patience as the oral histories took more and more of his wife's time and attention. He completed the review of his own oral history transcript when he was in the hospital just before his death in 1992. As some of the original advisors have died, others have been added to help in selecting interviewees, suggesting research topics, and securing funds.

The project was presented to the San Francisco section of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) on "Old-timers Night," March 10, 1986, when Philip Read Bradley, Jr., was the speaker. This section and the Southern California section of AIME provided initial funding and organizational sponsorship.

The Northern and Southern California sections of the Woman's Auxiliary to the AIME (WAAIME), the California Mining Association, and the Mining and Metallurgical Society of America (MMSA) were early supporters. Other individual and corporate donors are listed in the

volumes. Sponsors to date include seventeen corporations, four foundations, and ninety-six individuals. The project is ongoing, and funds continue to be sought.

The first five interviewees were all born in 1904 or earlier. Horace Albright, mining lawyer and president of United States Potash Company, was ninety-six years old when interviewed. Although brief, this interview adds another dimension to a man known primarily as a conservationist.

James Boyd was director of the industry division of the military government of Germany after World War II, director of the U.S. Bureau of Mines, dean of the Colorado School of Mines, vice president of Kennecott Copper Corporation, president of Copper Range, and executive director of the National Commission on Materials Policy. He had reviewed the transcript of his lengthy oral history just before his death in November, 1987. In 1990, he was inducted into the National Mining Hall of Fame, Leadville, Colorado.

Philip Bradley, Jr., mining engineer, was a member of the California Mining Board for thirty-two years, most of them as chairman. He also founded the parent organization of the California Mining Association, as well as the Western Governors Mining Advisory Council. His uncle, Frederick Worthen Bradley, who figures in the oral history, was in the first group inducted into the National Mining Hall of Fame in 1988.

Frank McQuiston, metallurgist for the Raw Materials Division of the Atomic Energy Commission and vice president of Newmont Mining Corporation, died before his oral history was complete; thirteen hours of taped interviews with him were supplemented by three hours with his friend and associate, Robert Shoemaker.

Gordon Oakeshott, geologist, was president of the National Association of Geology Teachers and chief of the California Division of Mines and Geology.

These oral histories establish the framework for the series; subsequent oral histories amplify the basic themes. After over thirty individual biographical oral histories were completed, a community oral history was undertaken, documenting the development of the McLaughlin gold mine in the Napa, Yolo, and Lake Counties of California (the historic Knoxville mercury mining district), and the resulting changes in the surrounding communities. This comprises around 120 hours of interviews with nearly forty people.

Future researchers will turn to these oral histories to learn how decisions were made which led to changes in mining engineering education, corporate structures, and technology, as well as public policy regarding minerals. In addition, the interviews stimulate the deposit, by

interviewees and others, of a number of documents, photographs, memoirs, and other materials related to twentieth century mining in the West. This collection is being added to The Bancroft Library's extensive holdings. A list of completed and in process interviews for the mining series appears at the end of this volume.

The Regional Oral History Office is under the direction of Willa Baum, division head, and under the administrative direction of The Bancroft Library.

Interviews were conducted by Malca Chall and Eleanor Swent.

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Regional Oral History Office

Eleanor Swent, Project Director
Western Mining in the Twentieth
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November 1995
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The Regional Oral History Office
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INTRODUCTION--Warren E. Fenzi

A true gentleman, an excellent engineer, a wonderful "boss," a great family man, a loyal friend, and a true motivator: each of which, or put them all together, is Warren Fenzi.

I was hired into Phelps Dodge at Morenci, Arizona in February, 1958. The community in general was missing the Fenzi family who had just moved on, but were thrilled that one of them had been chosen to join the Western Management of Phelps Dodge in Douglas, Arizona, and would still be involved with its life and work. Then in early 1962, I was transferred to the Douglas Reduction Works--again just missing the Fenzis who were now moving to New York City. Douglas was at that time partially a "company town," but the Fenzi legacy was very much in evidence. Warren and his family had left favorable and lasting impression on a second Arizona (and Phelps Dodge) community. And it is continuing to this date. Warren and Eleanor make at least two trips each year to Arizona and New Mexico visiting their five children and grandchildren--but also visiting many of their friends still residing in Phoenix, Tucson, Morenci, Clifton, Bisbee, Douglas, Ajo, Tyrone, and Silver City. Warren checks in at each of the mining operations to review mining plans, construction projects, and general operating conditions with emphasis on employee and community relations. Although it has been sixteen years since his retirement from active participation, his genuine interest and often wise counsel are truly appreciated by the operating people--some of whom were not even on the payroll when Warren was active.

In the fall of 1980 Warren and Eleanor made their last official visit to the Western Operations. In Morenci, a barbecue on a Saturday afternoon was attended by over 1,000 people--all friends of the Fenzis, although it had been nearly twenty-three years since the Fenzis lived in Morenci and despite the fact that 1980 had been one of our strike years. Respect for Warren and Eleanor was genuine and widespread among all community members--union officials and all.

The canyon between Old Morenci and the Reduction Works has been known for many years as Fenzi Canyon. It has been mining lore in the Latin American countries and, to a certain extent, in our border states that employees would assign the name of one of their *jefes* to some geographic feature, usually in "honor" of some engineering or operational bonehead or failure. I've tried and tried, but I can find no such "bonehead or failure" in the Fenzi history in Morenci (or anyplace else, for that matter), so I have to believe this name was bestowed in respect, as it should have been.

Large mining companies, including Phelps Dodge, often located their corporate offices in the financial centers, and thus it became absolutely essential that a highly qualified mining person be involved in that office. After the retirement of Mr. Louis S. Cates, Warren became that man for Phelps Dodge and he handled the responsibility involved expertly. And even

though Phelps Dodge was only a minority partner in Southern Peru Copper Company, the Phelps Dodge, or rather the Fenzi, influence was most evident in the mining plans and the mining operations.

I feel very privileged to have had the opportunity to report directly to Warren Fenzi for four years--four years which I will always remember and cherish, perhaps the most satisfying four years of my own forty-year career in the industry.

Arthur H. Kinneberg, retired
Senior Vice President and
Director, Phelps Dodge

June 7, 1996
Phoenix, Arizona

INTERVIEW HISTORY--by Eleanor Swent

Warren E. Fenzi was recommended early on to be included in the series on Western Mining in the Twentieth Century because of his long service from engineer to president and director of Phelps Dodge, a major copper mining company whose policies have been influential over the entire industry. Warren Fenzi's career includes most of the key events in Phelps Dodge company history, beginning with the effects of the Depression with its lingering memories of earlier labor difficulties, continuing through World War II, the Korean War, the energy crisis of the 1970s, the copper crisis of the 1980s, introduction of new mining equipment and processing methods, certification of the unions in 1943 and decertification about forty years later after a long strike which began in 1983, shortly after he retired as the director of Phelps Dodge.

Phelps Dodge changed from an underground mining enterprise to open-pit operations with hundreds of miles of railroad track and several smelters to a company run by technically trained men using the most up-to-date earth-movers in the mines and the solvent extraction-electrowinning process to produce very pure copper. Phelps Dodge (represented by Warren Fenzi) was called upon to join in Southern Peru Copper Company because of its internationally recognized expertise in open-pit mining. Fenzi was one of the company's leadership team which responded to the challenges of the times--international events over which they had no control, increasing public concern with the environment, and changing technologies--and maintained the company's reputation for excellence.

The interview of Warren Fenzi was facilitated by his sister-in-law Jewell Fenzi [Mrs. Guido Fenzi], oral historian and editor of *Married to the Foreign Service: an oral history of the American diplomatic spouse*, [Twayne, New York, 1994]. The letter of invitation to participate in the mining series was sent to Warren Fenzi in November 1994. Interviews were conducted at my home in Piedmont, California, on June 27 and 28, 1995, for nine hours when the Fenzis made a trip to the Bay Area. The transcript was sent for review in January 1996 and returned in April 1996. Warren Fenzi made some minor changes to improve clarity, and several additions indicated by brackets in the text.

The introduction is by Fenzi's longtime colleague and friend Arthur Kinneberg, now retired senior vice president and director of Phelps Dodge, and a key figure in Phelps Dodge operations and management during much of the period discussed in the oral history. Mr. Kinneberg was also an early supporter of the oral history series. He had been active in mining in Chile, and was instrumental in securing funding for the oral history of Robert Haldeman, *Managing Copper Mines in Chile: Braden, Codelco, Minerec, Pudahuel; Developing Controlled Leaching of Copper from Sulphide Ores; 1941 to 1993*, Regional Oral History Office, University of California, Berkeley, 1995.

The volume is of interest not only to students of the history of mining, but also of the history of California. I learned of this in the spring of 1996 when I visited Santa Barbara and was given a tour of the

city by Warren and his gracious wife Eleanor. An overlooking height, part of it now named Franceschi Park, is where Warren's grandfather Orazio Emmanuelle Fenzi had a forty-acre estate and plant nursery. Many of the local palm trees were introduced by him. There is a grassy area on the hilltop where Warren's parents were married by a Catholic priest, even though the bride's background was New England Protestantism; presumably the Fenzi name had some influence at the Vatican. The original home, much altered by a subsequent owner, is now in disrepair.

After lunch on a terrace at the Valley Club, overlooking fairways and the ocean, we went to their present home, where young Warren had lived with his parents and grandmother, near the Santa Barbara Mission. The century-old house has been added to and made more comfortable but not "modernized." By the door on the broad veranda is the Fenzi coat of arms with its motto "In labor is virtue." The living room has a twenty-four-foot Oriental rug, well worn, and a range of tasteful furnishings acquired through more than four generations.

There are paintings done by their daughter Louise, as well as a contemporary collage, Warren's choice, of three kinds of mirrors. A portrait of a patrician Fenzi forebear stands on a seventeenth-century Florentine marquetry table. On the floor beside it is a fine example of old Southwest Indian basketry. On another table is a contemporary San Ildefonso black pottery bowl. A large library table holds dozens of magazines; a curio table holds, among other things, a small pottery oil lamp used in an ancient Mediterranean copper mine. At one end of the room is a glass-topped coffee table, a retirement gift to Warren Fenzi, which houses a collection of beautiful copper mineral specimens and the range of copper mine products, including among other things native copper, a shiny ingot, and a flask of sulfuric acid.

The many bedrooms of the home are furnished with antiques from both sides of the family, but the bed in the master bedroom is contemporary, made by their son Warren S. Fenzi. The bedcover is a quilt put together by their five children to celebrate their fiftieth wedding anniversary. This is obviously a family with a strong sense of history and respect for work. As I prepared for the interviews and spoke with Warren Fenzi's associates, they all paid homage to his fairness and kindness to subordinates. He speaks frequently of the influential moral qualities of the Dodge family; he followed in that tradition.

The tapes of the interviews are deposited and available for study at The Bancroft Library, University of California at Berkeley.

Eleanor Swent, Project Director, Western
Mining in the Twentieth Century series

11 June 1996
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BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name WARREN EMANUELLE FENZI

Date of birth AUG. 4, 1915 Birthplace SANTA BARBARA

Father's full name CAMMILLO FRANCESCHI FENZI
LANDSCAPE ARCHITECT
Occupation REAL ESTATE BROKER Birthplace FLORENCE ITALY

Mother's full name DOROTHY JOSEPHINE REDFIELD FENZI
Occupation MANAGER - COMMUNITY THEATER Birthplace CLINTON CT.
LOBERO

Your spouse ELEANOR ^{HOUSE} LEEDS
Occupation HOUSEWIFE Birthplace PASADENA CA.

Your children CHARLES CAMMILLO FENZI, LOUISE REDFIELD FENZI - HAAG, WARREN SHAPLEIGH FENZI
DAVID LEEDS FENZI, JOAN FRANCESCHI FENZI

Where did you grow up? SANTA BARBARA CA

Present community SANTA BARBARA CA

Education SANTA BARBARA HIGH SCHOOL, CALIFORNIA INSTITUTE OF TECHNOLOGY B.S. CIVIL ENGINEERING

Occupation(s) MINING ENGINEER, MINE SUPERINTENDENT, GENERAL SUPERINTENDENT
VICE PRESIDENT, EXECUTIVE VICE PRESIDENT PRESIDENT PHELPS DODGE CORP.

Areas of expertise MINE PLANNING, MINE MANAGEMENT, COPPER FLOTATION METALLURGY
GENERAL MANAGEMENT

Other interests or activities GOLF, HIKING, GARDENING
READING

Organizations in which you are active BOYS & GIRLS CLUBS OF SANTA BARBARA

FENZI, WARREN E.

Home: 2121 Garden Street
Santa Barbara, CA 93105

Born: August 4, 1915, Santa Barbara, CA

1943-1945 U.S. Navy, Civil Engineering Battalions

BS, Civil Engineering, California Institute of Technology

1980-date Retired

1975-1982 Phelps Dodge Corp., President

1966-1975 Phelps Dodge Corp., Executive Vice President

1962-1966 Phelps Dodge Corp., Vice President

1959-1962 Phelps Dodge Corp. *ASS'T TO PRESIDENT*

1937-1959 Phelps Dodge Corp., AZ, Eng., Mine Supt., Gen. Supt., Asst. to
Gen. Mgr.

Member: AIIME; Mining Club NY

Director: Southern Peru Copper Corp.
Conalco, Inc.
Phelps Dodge Corp. (1966-1983)
St. Joe Minerals (1967-1983)
Santa Barbara Foundation (1981-1991)

Awards: Distinguished Alumni, California Institute of Technology, 1977

I A BROAD FAMILY HERITAGE

[Interview 1: June 27, 1995]##¹

The Warren Family of New England and California

Swent: Let's begin by your telling about your interesting family.

Fenzi: All right. I was born August 4, 1915, in Santa Barbara. My family--in two parts: my mother's side and my father's side--came from distinctly different areas of the world.

Josephine Warren, Elocution Teacher at Mills and Vassar Colleges in the 1860s

Fenzi: I will talk first about my mother's side. She was from New England. Her grandmother, my great-grandmother, came from Connecticut to California in 1863 to teach at what is now Mills College, elocution, which was a popular subject in those days. She brought her four-year-old daughter as she had been recently widowed.

Swent: Oh, my. How did she come, do you know?

Fenzi: She had to come across by boat to Panama and across the isthmus with the railroad, and then picked up another boat and went to San Francisco.

Swent: With a four-year-old.

¹This symbol (##) indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcript.

- Fenzi: She was in her early twenties at the time, her husband having died. He was older than she by twenty years, but having died suddenly of something.
- Swent: What was her name?
- Fenzi: Her name was Josephine Wood Warren. Her maiden name was Wood.
- They stayed here until 1868. She then went back to New England and taught at Vassar College, again elocution and that type of activity. She had the interesting distinction of going to Yosemite in 1865 with a group of men, four or five. I have a picture of that in the family album.
- Swent: She must have been a very brave woman.
- Fenzi: One of them was of the Livermore family, later of the PG&E group. I think she was somewhat fond of him, but we never knew--nothing ever came of that. After returning to New York, she died at the rather early age of fifty of cancer of the stomach.

Grandmother Sara Warren Redfield

- Fenzi: My grandmother in the meantime had gotten an education at Connecticut College, same as her mother had before her. She was a teacher for a period after her mother died and then married a Frank Redfield in Clinton, Connecticut, my mother's father.

He, in turn, died rather early, so she was left with a young daughter of eight years old in about 1900. She decided to come to California. She came to Santa Barbara in 1903, I believe it was. She managed a bookstore for Elder, a San Francisco book merchant who had established a store in Santa Barbara. So she supported her young daughter, Dorothy Redfield, who later on went to Mills College; that still was only a seminary then, two-year. She returned to Santa Barbara, where she met my father.

The Fenzi Family of Florence

Fenzi: My father's family were Florentine--Italy--where my father was born, one of twelve children, six of whom survived. His father's family were very wealthy bankers and industrialists in Tuscany. My grandfather was actually raised by his grandfather, as his father died when he was quite young, and his mother as well. He, having some leisure time, became quite an expert in botany.

Swent: What was his name?

Fenzi: His name was Emmanuelle Orazio. He traveled around many places of the world.

Swent: And then Fenzi was the last name?

Fenzi: Yes. He developed quite a reputation. He spoke six languages, corresponded in five. Anyway, when he was about thirty-eight, his grandfather having died earlier (1875) and his uncle, Carlo Fenzi, who had taken over the banking operations, also died in 1881. So he, being the oldest in line, took over the bank in 1881. He was running the bank at the time of the--I don't know if this is terribly interesting --but he was running the bank at the time of the 1892 world depression. An embezzlement took place in the banking firm and between that and the depression, he I guess essentially went bankrupt and sold all of his property, put it into the pool and left the country and came to Santa Barbara.

Emmanuelle Orazio Fenzi, Botanist, Comes to Santa Barbara, 1892 or 1893

Fenzi: He set up a nursery in Montecito--near Santa Barbara--where he could transplant plants and seeds from all over the world. He had developed quite a reputation for introducing plants to California for the next twenty years.

Swent: Were there relatives or friends already there then?

Fenzi: No. He picked it out because of the climate--mild climate, no frost. That's why he picked it. His wife and the two youngest children, my father being one, came over in 1899, his eldest daughter having come several years before. That's how

my father came to Santa Barbara. He of course went to school in Santa Barbara.

Swent: Your father's name was?

Fenzi: Cammillo. The Florentine spells names with extra letters.

He went to high school there, went back to Italy and did his military period. I guess he went to the University of Pisa briefly, but came back to Santa Barbara and continued with the landscape business started by my grandfather, who had returned to Italy by that time with his wife. Grandfather finished out his career in northern Africa, Tripoli, trying to introduce plants to the desert.

Swent: This was your grandfather?

Fenzi: Yes. Until he died there, in 1924, at 82. Anyway, he must have been quite a brilliant botanist.

Swent: Did you know your grandparents?

Fenzi: No, I was only five when I saw him briefly at my grandparents' 50th anniversary in Italy.

Of course, my mother and father met in Santa Barbara. They say at a dog fight on top of the mountain, both horseback riding with their dogs. The dogs got into a fight. [laughter] Anyway, that brings us up to date with the family in Santa Barbara.

Swent: That is an amazingly broad heritage, isn't it?

Fenzi: Yes.

Warren Fenzi, Civil Engineering Student at California Institute of Technology, 1933-1937

Fenzi: I went to high school in Santa Barbara, then went to Cal Tech. [California Institute of Technology]

Swent: How did you happen to pick Cal Tech?

Fenzi: Well, it was kind of happenstance. I was going to try to go to Stanford where some of my friends were going. Another friend, John Van Fleet, said he wanted to take the examination

at Cal Tech. So I accompanied him down there and we took the examinations together. When we both passed, we decided to go to Cal Tech. John's father was a mining man. He was with Union Carbide; they had quite a few special metal mines in the twenties and thirties.

Swent: So you were starting college in 19--?

Fenzi: I started college in 1933.

Swent: That was a tough time.

Fenzi: September. Yes. Of course, tuition was somewhat different. We did pay tuition, \$300 a year. The rent, board, and room was about the same, about \$300 a year.

Swent: Where did you live?

Fenzi: They had new dormitories they had just built for their students.

Swent: Was your father's nursery business flourishing at that time?

Fenzi: No. He had a very difficult time. He was in the real estate business by that time. He made most of his money on small rentals and an occasional ranch sale, which wasn't very much. I guess he sold a small piece of property which helped. Of course, we always worked summers.

Swent: What did you do in the summers?

Fenzi: I did various things. I started out working clearing brush for him on some of the properties that he was trying to sell, or people that he sold properties to that needed the work done for them. Then I was a carpenter's helper for a summer. That was a pretty good paying job, fifty cents an hour. Then I was a lifeguard for a group of people in the summer, one of whom offered me a job when I graduated, Consolidated Steel, Mr. Reese Taylor, who later became president of Union Oil. I worked for his family, with others, so knowing me, he did offer me a job as a draftsman after I came out of Cal Tech.

Swent: Were there others in your family? Do you have brothers and sisters?

Fenzi: I have two brothers and a sister.

Swent: Where were you in the lineup?

Fenzi: I am the oldest.

My father was killed in an automobile accident just two days after I graduated from college. We had just come home from the graduation.

Doctor L. D. Ricketts, Supporter of Cal Tech

Fenzi: In the meantime, I had met through my father, who knew him, Doctor L. D. Ricketts. He was quite a famous metallurgist in the early days of mining, having built the leaching plant at Ajo [Arizona] and some of the mills at Morenci, and [was] an investor in mines. He had retired to Pasadena, had a home in Santa Barbara which was where my father met him in connection with some landscape work he had done for him at the home.

Dr. Ricketts was a major donor to Cal Tech in the twenties when they reorganized the institution from Troop Military Institute to Cal Tech. The group got Doctor Millikan, the physicist, to head up a new institution. He was a physicist and Nobel Prize winner. Dr. Ricketts was one of the local people who gave a good deal of money to Cal Tech during that time--rebuilt the new dormitories and so forth. They named one of the dormitories after Dr. Ricketts.

I happened to end up in Ricketts's House. Dr. Ricketts and his wife used to come to dinner about once a year as our guest. They were a very delightful couple, no children. But I occasionally as an undergraduate used to visit in his office with him. He would give me some of his background in mining, and we would talk a little bit. He was a quiet man. He was the one that later got me the job offer at Phelps Dodge.

Swent: What did you study at Cal Tech?

Fenzi: I was a civil engineer. Reese Taylor offered me a job as a steel designer draftsman at Consolidated Steel, and the other job offer was through Dr. Ricketts, who had written the general manager at Phelps Dodge. Dr. Ricketts was a director of Phelps Dodge.

Father Cammillo Fenzi, Landscape Architect in California and Arizona

Swent: Was it your grandfather or your father who had a connection with the Douglas family?

Fenzi: My father. I mentioned he continued the landscape work after his father went back to Italy. He and his sister, Ernestina, then she left for Italy too, but then he went into kind of landscape architect business in Santa Barbara. He worked on quite a few of the Montecito estates. There was a great craze of gardening in California and all over the country by wealthy people. They came to California, especially southern California, and even northern California, and built these estates with the beautiful gardens.

There was quite a bit of business during this First World War period up until about 1921 and the depression in '21. And after that, in early 1920's, he started to work in the Dreyfus Real Estate Office. My father and mother went back to North Africa in 1925 to run the concession there that my grandfather had started on the edge of the desert in 1914, to help out the family for a year.

Swent: Did you go?

Fenzi: No, my mother was afraid they might convince my father to stay over in Italy, so she very judiciously left her children with her mother who was living with us, my grandmother. We stayed in Santa Barbara while they went for a year to North Africa. When he came back from there, he went into the real estate business. I think he had started maybe just before then. He was in the real estate business from then on, until he was killed.

Mrs. Walter Douglas and Landscaping Phelps Dodge Properties

Swent: The job that he had for the Walter Douglasses--?

Fenzi: Early on, just after his father had left for North Africa, my father did a landscape job on their home in Santa Barbara. She liked what he did, I guess, and she hired him to landscape the stations out there, in Arizona, that the Phelps Dodge Company owned for their railroad which transported their ores from Bisbee to El Paso, and from, I guess from Tyrone, New

Mexico--at least from Phoenix to El Paso. And they had two lines that paralleled Southern Pacific. In those days, they thought the Southern Pacific charged too much for freight, so they built competing lines. The railroads were built rather--in fact, the amount of railroads in that part of the world was unbelievable.

Swent: Lots of railroads.

Fenzi: Small gauge, most of them. Not all of them. The big ones, like from Douglas to El Paso, were the standard gauge.

Swent: And Mrs. Douglas wanted the stations to be attractive? This is Mrs. Walter Douglas?

Fenzi: Yes. She liked gardens. Being the wife of the president of Phelps Dodge, she had the influence to get to decorate the stations. In fact, as you probably--well, you probably don't know, but the town of Tyrone was laid out by her and Mrs. Cleveland Dodge (Polly).

Swent: I've never been to Tyrone.

Fenzi: --was a very unusual mining town built at the time of the First World War. They had a famous architect, White, from New York, do the design of the buildings and townsite.

Tyrone, New Mexico, the Epitome of a Mining Town

Swent: Stanford White?

Fenzi: I believe that was his name. They had him come out and design the buildings, the hospital, the plaza, the store, school, church, houses. It was a very attractive brick and stucco Southwestern architecture, somewhat like you have around Albuquerque, Sante Fe style. It was built in 1915--as I said, the middle of the First World War. Unfortunately, it was an underground mine, as most mines were at that time. They had some high-grade areas which they mined, and the price of copper at that time was up in the high twenties. But once the war was over and the '21 depression hit, the prices dropped. It was never economic to operate again, so it operated only for about a period of about five years, until much more recently when it was reopened by the company. It was the epitome of a beautiful mining town.

Swent: Perfectly planned.

Fenzi: Perfectly planned. During the twenties, they used it as kind of a resort community, and rented out the cottages to people who wanted to come and spend the winter out there. It was a very attractive place. It was interesting. Although it was always a questionable investment.

Mr. and Mrs. Cleveland Dodge, Sr.

Fenzi: But on the other hand, the Dodges took an active--not only the Dodges--also took an active part in the mines. Mr. and Mrs. Cleveland Dodge, Sr., were involved in Tyrone. I think they were the ones that probably as much as the Douglasses had more to do with the design of the town. He, Mr. Dodge, was a vice president, and a large stockholder of Phelps Dodge and one of the top people. He wasn't the chief executive, but he was very influential in New York. They had a great influence on a lot of things in the mines, they came from a Presbyterian family, and were dedicated to doing things for people. When they were first married, they lived in Douglas so he knew the west.

Swent: Did you know them?

Fenzi: Very well.

II WORKING FOR PHELPS DODGE, 1937 TO WORLD WAR II

A Job Offer through Dr. Ricketts

Swent: Well, let's start with your getting employed, then, and how you got into Phelps Dodge. This is 193--

Fenzi: Nineteen thirty-seven, I graduated from Cal Tech. I had two job offers. One was with Consolidated Steel in Los Angeles, and one with Phelps Dodge in Morenci through Dr. Ricketts. I accepted the job at Morenci.

Swent: What led you to accept that over the other?

Fenzi: Probably because my father had been out and liked Arizona. He told tales about it.

Panning for Gold Near Prescott, Arizona, 1932

Swent: Had you been there at all?

Fenzi: No. Well, yes, I had been there. I had been to Prescott while I was in high school, tried to mine a little gold, which was, I guess, my first entrance into mining.

Swent: Tell about that.

Fenzi: We had friends in Santa Barbara who had two boys, my contemporaries. She, Mrs. Manning, had some leases on a mining claim, placer mining claim, in Prescott. I knew the Manning boys, especially the one my own age. Somehow it all developed that they offered for us to go out there and spend the summer at her claim, panning for gold. This was in 1932.

We went with two or three older boys, because we were all--we were fifteen or sixteen--who did the driving. There were about six of us. We got out there at this Prescott location, which was an outdoor tent in the summer. We found out about summer rainstorms, thunder and lightning and so forth. We came out there and worked very hard at mining, panning the gravel from the stream bed, dry stream bed--except when it rained--for about three weeks out of four weeks, in Arizona. When we got all through and panned it out, I think we had about an ounce and a half of gold. [laughter] So I still have the gold.

Swent: One-sixth of it, anyway.

Fenzi: Then we decided we'd worked enough and we gave up panning for gold and enjoyed the last week, by touring a part of Arizona and then came home. It was interesting. Anyway, that experience and my father's telling of tales of Douglas and Bisbee. I didn't know much about mining, but I thought that might be more interesting than being a draftsman down in the middle of Los Angeles. I never cared too much for Los Angeles as a place to work.

Swent: Had you met Eleanor by then?

Fenzi: I had met Eleanor. She, perhaps initially, didn't think I made the right choice.

Swent: She preferred Los Angeles?

Fenzi: No, but we weren't married, and I went off to Arizona for three years before we got married. But it worked out quite well.

But let's start on when I went to work.

Junior Engineer Working on the Open-Pit Mining Method

Swent: How much were you paid?

Fenzi: I was going to tell you that next. It was a better salary than others offered to my classmates. They offered me 125 dollars a month, plus bonus, which related to the price of copper, which made it about 140 dollars when I started.

Swent: That was a lot at that time.

Fenzi: It was a lot of money, because my colleagues at Cal Tech were mostly around 100 dollars. A drafting job was about 100 dollars. Some of my colleagues in the business world were getting seventy-five dollars in the banks at the time, and some weren't getting any jobs at all. So it was a good offer financially.

Swent: Very good. Were you a good student?

Fenzi: I was fair, above average. I was just in the top third of my class. I had a B average. Didn't work as hard as I should have, but that didn't matter, I guess.

But it was interesting, when I went to Morenci, which had been shut down for the Depression in 1931, it had been down for six years. They were started all over again in Morenci, with a whole new open-pit mining development, which was new to that area.

Swent: You were hired to work on that?

Fenzi: I was hired as a transitman, or surveyor, or engineer--hired junior engineer, whatever you call them. It was a brand new project for Phelps Dodge at Morenci, to develop a new mining method, it was open-pit, and to build whole new facilities. In 1936, they had had a bond issue for thirty-two million, which one of my friends of the family gave me a copy of, which somebody else purloined somewhere along the line--the prospectus for this thirty-two million bond issue. Anyway, they successfully floated that.

That bond issue in 1936 to build this new open-pit complex in Morenci had been studied in the twenties. Of course, the Depression came along and stopped all interest in it.

Swent: Had it been an open-pit before?

Fenzi: No. It had been an underground mine when it shut down. The first mining started in 1880. By the time of the twenties, as I mentioned earlier, it had been consolidated into Phelps Dodge buying all the other companies who had been there in the district in earlier periods.

Swent: That was Calumet and Arizona?

Fenzi: No. There was a company known as Arizona Copper, no connection, Scotch Company. There was a Shannon Copper Company. I don't remember all the names, but Detroit Copper was the one that Phelps Dodge bought originally, and that was

when Phelps Dodge started, in 1890. But the Arizona Copper Company was a big producer, one of the larger ones. And the two companies owned most of Morenci with other smaller companies in the surrounding mining areas in Metcalf.

Swent: But it had all been underground?

Fenzi: All underground, and mostly high-grade mines, on the various orebodies which were quite numerous around the district located in or near Metcalf and Morenci, which are not too far apart, about four or five miles. By the time--after the recession in 1921, Phelps Dodge had consolidated it all. In the late 1920s, they had studied the matter of an open pit near Morenci, and they had studied the question, whether it be a flotation-type concentrator or a vat leaching type, but all decisions stopped at the shutdown in 1930-31. Mr. Louis Cates, of course, came in from Kennecott as president of Phelps Dodge in 1930.

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Louis Cates and the Depression Bring Changes, After 1930

Fenzi: He was the one who made the decision on the bond issue, which took some courage, in 1936. He also acquired a refining company which was located in El Paso and in New York, two refineries. He also acquired several copper manufacturing operations, all in the early 1930s.

Swent: When you came, you were aware of these--?

Fenzi: It was in the prospectus of the bond issue, describing Phelps Dodge and some of this. He also acquired prior to 1936 the C&A (Calumet and Arizona) and United Verde Mining companies, as you have mentioned, bringing into the Phelps Dodge Western Mining [division] the people from those two other companies, one who became general manager, Mr. Harrison Lavender, who came from C&A.

Swent: That was Harry Lavender?

Fenzi: Harrison Lavender. And Mr. Charles Kuzell who came from United Verde, Mr. Barker from United Verde, and others, competent people. So by 1936, they decided to move ahead with Morenci. They sent Mr. Walter C. Lawson from Ajo up there as chief engineer, and Mr. Ernest Wittenau as general superintendent.

- Swent: Ajo continued to operate through those years?
- Fenzi: They did operate. Ajo operated--Ajo was shut down for nearly two years in the great Depression, but it operated somewhat more because it had gold in the ores, and had good gold credits. The United Verde had some gold, and it operated most of the Depression. Bisbee operated because of the gold credits during most of the Depression, but at reduced rates.
- Swent: So when you came on board, it sounds as if the attitude was that things were beginning to come up.
- Fenzi: They were beginning to get better--the price of copper had moved up. The price of copper hit a low of five cents, I think, in the middle of the Depression. By the time I was hired, it was up to sixteen cents for a short period of time before it went back down to ten. The second year--and so in 1938 we had kind of a setback or recession. The Phelps Dodge board met in Morenci in the early spring of 1938 and decided to cut back the operation at Morenci, the development of Morenci, by one-third. They laid off about a third of the crews.

The Recession: Morenci Cut Back by One-Third, 1938

- Swent: Did that scare you?
- Fenzi: Well, we went from a staff house that was full of young engineers down to three people. There were about twenty of us there, and there were three left over after the layoff. Because they did pick out single people more than they did married to some degree if they could. But it was a setback for a lot of people because they--?
- Swent: Were you one of the three that stayed?
- Fenzi: One of the three that stayed, yes. But it was quite a setback to the morale of the people who were coming up in their first job for five or six years. It only lasted for about a little less than a year and then they built up again and started rehiring people again.

Company-Provided Benefits: Housing, Hospital, Schools,
Recreation, Store

Swent: Talk a little bit about the--

Fenzi: Back to the town and some of the benefits--

Swent: Yes. You lived in the staff house.

Fenzi: I didn't--initially, I came and lived in the boarding house because there wasn't any staff house. It hadn't been opened yet. So I lived in a boarding house. I lived in a person's house, and then a boarding house for eating. I ate in a boarding house all the time I was single (three years).

Swent: What was the difference between a boarding house and a restaurant?

Fenzi: The boarding house was similar to--a person who set up a boarding house would use their own house and set up a table, and they would take in people for meals and sometimes for roomers who stayed there. But the one I went to was just for meals. We ate at this boarding house, what we called a boarding house, a term that probably covered an awful lot--because my brother Guido, Jewell's husband, lived in a boarding house here in Berkeley. They boarded; in other words, they lived in people's private houses and were served meals. So it was a common thing for many years.

Swent: But it has gone out now.

Fenzi: Yes, entirely. Well, I guess mostly gone. I suppose there are some. Even my grandmother made money and lived on boarding people when she moved to Santa Barbara, part of her income.

Swent: It was accepted thing for widows to do.

Fenzi: For women, that's what some of them did.

Swent: So you lived in one house--

Fenzi: In the fall of 1937, I moved into the staff house, which had no meals, just beds and rooms.

Swent: Separate rooms, private rooms?

Fenzi: Two to a room, or it depended. Of course, when we got down to three, we had one to a room. The doctors that weren't married

lived there, some of them. For Phelps Dodge had their own medical program which had been reactivated with the start-up after the Depression. They had a hospital when I arrived.

Swent: It had been a very paternalistic system.

Fenzi: Since 1900, they always had had free medical treatment. There were also state schools, through high school. Most of these towns did not have--as you may or may not know or don't remember, Arizona had a system where the community supported the school. There was no state support back in the twenties and thirties. So a mining community pays for the school. Of course, the normal idea was that the people living there would pay taxes on their property and that would support the school. That was the case in most of Arizona, but in the mining communities, of course, the company would pay the taxes, because nobody owned any property, basically, with one or two exceptions.

The financing of bonds needed to have votes of property owners in those days. You didn't vote on property bond issues unless you owned property in the state or the district. You weren't eligible to vote for school bonds unless you were a property owner. So a lot of the bond issues were passed by the two people in Morenci who owned property there. One of them was Larkin Neal, Helen's father; Helen is the one that is Mr. Arthur Hall's wife. Larkin owned a bat cage for guano which he sold and the other man owned a couple of mining claims, who worked for the company but he owned these special mining claims, so he could vote. So these two men and their wives would vote on the school bond issues to whatever amount was necessary to build new schools. [laughter]

Anyway, they had a hospital and they had the schools. Then they built, or furnished, a staff house. They built a teachers' court where young unmarried women who were secretaries and teachers would live. They called it a teachers' court, but it was really for young women who did various things, the secretaries and teachers. Rents were low.

Swent: Was there a company store?

Fenzi: There was a company store which had been shut down during the recession. Although during the Depression, the grocery department, I think, was leased out to two men from the company who didn't have a job, so they ran the store during the Depression for five or six years; it only had groceries, a small grocery. A company store was a general store which had everything: groceries to furniture to clothes to hardware. There was a very large company store in town built in the

early 1900s. There was a theater and recreational building. It had bowling alleys in the basement and a ballroom which was used as a movie theater.

Swent: Were there other stores as well?

Fenzi: There were. After--when we started to open up, they leased land to other store owners. The so-called company store was kind of a misnomer. I am sure it was a profitable operation, but not very profitable, actually. It was a kind of a bellwether to hold prices down in the district. People in the nearby community could raise prices up because of demand. The company store, when I was acquainted with it, was priced on the basis of state prices in Phoenix and Tucson, so that local stores couldn't gouge their customers.

When I moved there in 1937, there was not any housing. People lived in private homes--and there was some gouging in rentals. At least, when you talk about a man making forty cents an hour at the bottom labor skills, or even as much as a shovel operator, which is the highest skilled laborer, which I think was eight dollars a day. A skilled machinist, carpenter, i.e. journeyman, those got about six, with the bottom rate at three dollars and twenty cents, which had just been established as the minimum rate under Roosevelt, as I remember, in 1936, the same time that Social Security was put into effect.

Swent: Forty cents an hour.

Fenzi: So the bottom level was forty cents. It is hard to believe. Money doesn't have much relation today to then.

Swent: Right, the prices were so different.

Fenzi: I don't know any way to compare it.

Surveyor and Diamond Drill Sampler, 1937

Swent: So your beginning job was a transit man?

Fenzi: Well, doing surveying work for the town sites and for some mining claims. We were filling in fractions of the property which would then open--. One of our jobs was to take all of the mining--we had a lot of mining claims--and to be sure there were no fractions left that were not covered by claims.

Swent: What sort of equipment did you use?

Fenzi: Just horses to carry mining claim posts and basic surveying instruments, transit--

Swent: Transit, plane table?

Fenzi: Yes. We did some plane table work. The other job I had for a while was sampling on the drills that were drilling the orebody to assay the deposit.

Swent: What kind of drills were they?

Fenzi: At that time, they were usually diamond drills. Somebody had to be there, the sampler, to do the treatment--taking care of the samples that came out of the hole, be sure they were properly handled.

Swent: Were you analyzing them or just logging them?

Fenzi: No, just logging them and sending them to the laboratory for analyzing, being sure they were properly marked.

Swent: Had you learned any of this in college?

Fenzi: This was all just picked up as you went along.

Swent: The surveying you might have studied, you had studied that.

Fenzi: The surveying, I knew surveying.

Swent: You had studied that. But the handling of the drill of course you learned on the job?

Fenzi: That wasn't a very difficult thing to learn.

Salvaging Old Rail; Shipped to Mexico and Sold Eventually to Japan, 1938

Fenzi: One job I had was to go out with one of the labor crews and pick up the old rail from some of these railroads around the district from the old mines. I would keep track of it for them, and they would cut them up and put them in trucks and take them down to the railroad, shipped them to Mexico for scrap, all went to Japan.

Swent: From Mexico?

Fenzi: Yes.

Swent: There was a lot of collection. Were you aware that it was going to Japan?

Fenzi: I was aware. I don't know--at the moment, I don't know, but I know that late in that period I was aware that it was going to Japan.

Swent: Of course, the war in Europe was well begun by then.

Fenzi: No, not in '37 or '38.

Swent: Well, '38 and '39 was when it began, and the copper price began to reflect that.

Fenzi: But Japan had invaded China while I was still in college. That was '36. And Manchuria was even before that.

Japanese Classmates at Cal Tech

Swent: Were you aware of that at that time?

Fenzi: I guess I was. There were two Japanese in my class. One of them I was quite close too, I saw a lot of him. We used to run the "880" together, the half-mile together--not well, but we ran it. Another man who was quite a brilliant student--the fellow I was close to was about like I was, a medium student. But I understand that they couldn't get a job. They took aeronautical engineering at Cal Tech. There weren't any jobs in southern California that would hire Japanese. So both of them went to Japan. The bright one, I think, designed the Zero aircraft for the Japanese, their famous Zero airplane.

Swent: What was his name? Do you remember?

Fenzi: No. It started with a Y. My friend was Noble Nojima. The other one started with a Y. I didn't know him nearly as well. Both survived the war; I heard that afterwards. I haven't seen them since they graduated. So that's a side issue.

Swent: But you were aware, though, of the international scene, obviously.

Fenzi: Yes. That's what we did: shipped a lot of scrap to Mexico and it was transported to Japan; old mine cars, and rail, and whatever made good iron scrap.

Swent: What kind of earth-moving equipment were they using when they started the pit?

Fenzi: When I got there, Mr. Lawson had been up there about three months. They had rebuilt the railroad from Clifton to Morenci, which was a narrow-gauge prior to the Depression. They put standard-gauge to bring equipment up from the railhead at Clifton, where the Southern Pacific delivered. Then it was transferred to a branch line owned by Phelps Dodge, and hauled up to Morenci. They had started building roads in the mine, access roads. But the shovels didn't get there until--I went there in July, and the first two shovels came in September. The shovels were big at the time.

Equipment and Training for the Pit Development

Swent: What kind were they, and what size?

Fenzi: They were Marion shovels and used 5-yard buckets. Along with them came the 22-yard trucks which held about thirty tons.

Swent: Do you recall what make they were?

Fenzi: They were Macks and Whites. There were two makes, same types. They had been designed for Hoover Dam, for their aggregate hauling at Hoover Dam, which had happened in 1932, 1933, '34.

Swent: What kind of fuel did they use?

Fenzi: They used gasoline engines.

Swent: Not diesel?

Fenzi: Not initially. They had chain drives and 3-axles. Churn drills were used for drilling blast holes, 8-inch churn drills. Of course, there was the necessary support equipment like bulldozers, graders, transportation trucks, etc.

Phelps Dodge's Good Safety Record

Swent: What sort of safety--

Fenzi: Well, it was quite interesting. Phelps Dodge had quite an elaborate safety program in the twenties. When we went there--when I went to work, I got a safety indoctrination to start with. I had to go to safety classes once a month. Everybody in the plant went to a safety session once a month.

Swent: Was this a serious session?

Fenzi: Yes. Quite serious. We had a pretty good safety record, actually, compared to even future records. Our record was as good in 1937 through the Second World War as it was through the sixties.

Swent: Did you wear special shoes, and glasses, and--

Fenzi: We had safety-toed shoes. Glasses were only required doing certain jobs, and hard hats only on certain jobs.

Swent: When you began, the shoes were the only requirement?

Fenzi: Shoes, I think, were the requirement for everybody to wear.

Swent: Did you buy them or did the company provide them?

Fenzi: I bought them at that time. You were required to wear them on the job. It can get you into bad habits: I used to move furniture in my apartment for my wife, and I would put the table on top of them. And then you put on other kinds of shoes, and you'd be--

Swent: [laughs] Damage a few toes.

Fenzi: But we had hard hats on most of the jobs in the mine, not all of them.

Swent: What were they made of?

Fenzi: They were made of fiberglass, the first ones, they were kind of a--the ones you saw in underground mines, they came out of the underground mines. They were that red fiberglass type hat. Your husband must have had one of those.

Swent: Oh, yes.

- Fenzi: That's what we had, that type of hard hat. Later we had others. We tried aluminum hats for a while, which weren't very satisfactory. They'd blow off in the wind in the outdoors.
- Swent: Not very good in desert heat either.
- Fenzi: Not very good with--well, they were all right in desert heat because of the color, but they weren't very good for around electricity either. That's why I didn't like them underground. You had all of those possible chances of encountering a wire. Although that was not a hazard particularly.
- Swent: But while you were working in the pit development, you didn't have to wear a hat, you said?
- Fenzi: Outside of the pit, on the site surveying and things like that we wore just--we wore hats. My boss was quite hot at me one day that we showed up and no one was wearing hats, so we started wearing hats. I wore a hat all the time.
- Swent: For protection from the sun.
- Fenzi: Sun. We had a mixture of hard hats in the earlier period. In fact, it probably made as much sense as it does now, because you don't need a hat everywhere, you need a hat for certain things for sure and for other things it is not so important.
- Swent: What was stressed in these safety sessions?
- Fenzi: Thinking, which was really the center of safety. Not particularly devices, but just think, plan, that kind of thing. Then we discussed accidents that happened, and then why they had happened, how they had happened. Kind of a no-fault approach to it. We didn't discuss who was to blame. We discussed more as to how you benefit from the example.

The Labor Situation: Legacy of the World War I Strike and the 1931 Shutdown

- Swent: What was the labor situation at that point?
- Fenzi: It was non-union. I don't know what the labor situation was in Morenci before the Depression. I know there was a period in the First World War when Morenci was on strike for almost two years, 1917 and 1918. But I don't know whether there were

unions in the twenties or not. I have no idea, for some reason.

Swent: That First World War strike caused a lot of anger. Was there still--

Fenzi: No, but of course, no one--see, was in Morenci from that strike period due to the 1931 shut down. Most everybody moved out, except for a few people. A few people stayed, and some did all the way through. A lot of people in the early mining--and Morenci is an example of that--when you came to work as a miner, they gave you a place to put up a shack, and you built your house. There were those types of houses on the hillsides in Morenci. The people had a lease on the ground; the lease was a dollar a year or something.

Swent: Were they still there when you went there in the thirties?

Fenzi: Yes, there were a lot of houses of that type. Some were much nicer than others. And the people that left during the middle of the Depression--but some stayed--did various things, even tried gold mining in the creeks. Morenci was not a very good gold district, but they could get some gold out of the gravel. They dug the Gila Conglomerate, a formation along the Gila River, that's where they get the name, I guess. It is a semi-consolidated gravel bed, quite thick. And in that, there is a certain amount of gold, very small quantities. People tried to dig holes in that and mine. They got some gold.

But it was a pretty tough period, the shutdown in '31. So the people that had been there before when we started up were all new, except for these few that stayed on. Some of the Mexican families stayed on and came back to work after the Depression. A number of the Mexican families were craftsmen, boilermakers, machinists, and like that. There were those. Then there were the new people they hired, came in mostly out of the southern part of the country, a lot of people from west Texas and Oklahoma.

Swent: Were these people with mining experience?

Fenzi: No, they were just looking for a job. Some had experience. People like machinists came out from wherever, carpenters, experienced carpenters, and electricians. They hired them as skilled laborers. We had an employment agent right there at the property. So most of the hiring was done right there. They had notices in Phoenix and Tucson of recruiting. But they came in to Morenci to be hired. They came from all over, some from Detroit, automobiles. Some of our machinists came from there.

Illiteracy, Language Barriers

- Fenzi: A number of them were illiterate. In fact, on our drilling crews, I remember we had to make out reports, and we had to be sure we put a person that could read and write with someone that couldn't. There was a number of them that couldn't read or write. So the safety effort was verbal, a lot of verbal, because not everybody could read the manual.
- Swent: These were not Mexicans, these were American laborers?
- Fenzi: Yes, whites, from various parts of the country that hadn't had a full education. Most of them were very intelligent. They could sign their name easily.
- Swent: Were there any blacks?
- Fenzi: No. There were blacks in the district left over from a black cavalry from the Indian war period. There were black families in some of those towns near us in Morenci, in the valley. One or two went to work for us, but as I remember, there were maybe two blacks on the payroll. Mainly Mexican extraction, who had been imported from Mexico in the 1900s or the 1910s after they ran the Chinamen off. Early Morenci was Chinese. You may remember the history there, the railroads and the mines, they had a lot of imported Chinese labor for both. Then the threat of the "Yellow Peril," so our government shipped all the Chinese out, a lot of them to Mexico. Talk about export. I don't know about where they sent them, this happened around the 1900s, 1890s. Some of them migrated, of course, and a lot of their descendents are here in San Francisco.
- Swent: But when you were there, most of the laborers were white Americans, English-speaking?
- Fenzi: I would say there were at least half Mexican and half white.
- Swent: And could the Mexicans speak English?
- Fenzi: Oh, yes. Most of them were second generation, and most of the Mexicans were literate. They had been there in the schools, and the schools there were pretty good. They were literate in English. There were a few Mexican immigrants who could speak English, but it was very difficult to understand them. They were from Mexico and had learned English as a second language. A track foreman on that construction, Pablo Gonzalez, was a very good man, but I had to kind of forget about what he said and just listen in general to what he was saying, and it was a

mixture of border Spanish and English. We got along very well, but I couldn't decipher word for word what he was telling me, but it worked.

Swent: Were any of the supervisors Mexican?

Fenzi: A few were supervisors. Track foremen. There were some at the lowest levels.

Swent: A track foreman, you called him?

Fenzi: Yes, track foreman. He had a track crew which he supervised for the laying of track. He had mostly Mexicans on the crew, although they had some whites on the railroad crews, too.

Swent: I was just trying to get a little feel for what the labor situation was.

Fenzi: A lot of them were Mexicans. Most of them were from the area, but there were also a lot of whites from Oklahoma, Arkansas, and west Texas and local towns in Arizona.

I guess there had been segregation in the theater. We were told that. The theater had a dance floor--it was a big building, and there was a big room for--movies with bowling alleys downstairs.

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Swent: I think we missed a little bit there because I got so interested I forgot to change the tape, but you were saying that when you were there that the new theater was not--

Fenzi: When I came in 1937--

Swent: The theater was not segregated then?

Fenzi: No. We'd heard it had been.

Some Segregation in Work

Swent: What about the work?

Fenzi: Yes. There was some segregation in work. There was no segregation on the lower-level jobs. In fact, one of my colleagues--a mechanical engineer--the year he graduated from the University of Arizona, he came to work when I did, and the

only job he could get was as a pipe helper on the pipe crew, which was the lowest paying job. Then he finally got a job in the engineering department in drafting and so on. There was no segregation on the crews as such on the position, but there was segregation on what position they would offer some of the Mexicans.

Swent: Supervisors were mostly--

Fenzi: Supervisors--to some degree, yes, mostly. Although work crews, like the track crew, were Mexican supervisors. But the shovel operators tended not to be Mexican.

Swent: Was the pay scale the same?

Fenzi: In any given job, the pay scale was the same. The only difference was that some of the jobs were not quite open to some of the Mexicans. At least I have seen articles which suggest there was different pay for the same job, which wasn't true.

Swent: Not when you were there, anyway.

Fenzi: Since 1937, anyway.

Swent: So you began to rise up through the ranks.

Fenzi: Mr. Lawson, who was the chief engineer, I worked for him for the first period up through into 1939.

Swent: What was his first name?

Fenzi: Walter C. In various activities, really, including that he was in charge of construction of the railroads, so I was really working for him on that track installation job. Then I went over to work for the pit superintendent for a while, as assistant to him in the office. Then I was appointed to that drilling and blasting job in the mine.

Supervising Drilling and Blasting; Experiments with Explosives

Swent: What did that involve?

Fenzi: That particular position was mostly involved in the powder loading and blasting of drill holes, measuring the holes and figuring the amount of charge to put in the hole, supervising the crews, and loading the hole.

Swent: What kind of powder did you use?

Fenzi: That developed over a period of time. We started off with dynamite. Then they developed some cheaper types of explosives which were ammonium nitrate types--well, they're all ammonium nitrate--but ammonium nitrate type that was less expensive. As time went on, we even tried liquid oxygen and carbon in one or two experimental blasts.

Swent: Did you make your own oxygen?

Fenzi: You had to bring liquid oxygen into the area for that particular one. You dipped your carbon chunks into liquid oxygen and then load them in the ground, but you have to shoot with them before the oxygen evaporates. So you have to move pretty quickly--not too quickly, but you have to shoot and load, on the same day. Whereas the other powder you can load the ground over a period of two or three days to get a blast loaded before you have to shoot it.

Swent: Was this your idea, this research?

Fenzi: Yes and no. I guess we heard about it and made arrangements to try some of these experiments. One advantage to liquid oxygen was that once it evaporated it was no longer explosive, whereas other types of powder were always explosive. When you had--which occasionally happened--a missed hole where it didn't explode in the blast, which would occur occasionally because of some fault either in the fuse, then you would have the problem of digging it out, which had some hazard connected with it, although we didn't ever have any accidents doing it.

As time went on, they got into the fertilizer type explosive which was talked about in this recent explosion over in Oklahoma [City], when they mixed fuel oil with prills, they call it, ammonium nitrate prills, which are like the prills they use as fertilizer. And it becomes explosive.

Swent: But that didn't come in until much later, did it?

Fenzi: That came in after the war, in the fifties.

Swent: The period we are talking about now in the late thirties, it was--

Fenzi: We were using straight dynamite, the old standard.

Swent: With caps?

- Fenzi: No, we used primacord, which contained an explosive (P.E.T.N.) in the fuse. It was inert--it was quite a safe fuse, because it took a strong explosion and fire (an electric cap) to set it off. All the holes were primed with primacord. That had already been developed when I went there. We used regular fuse caps and sticks of dynamite when we were breaking boulders, where we would drill them and shoot them.
- Swent: What kind of drills were you using?
- Fenzi: Churn drills, like in the water well drills. We were using churn drills in the--
- Swent: These were down, then?
- Fenzi: Up and down, eight-inch diameter hole.
- Swent: Who made the drills?
- Fenzi: Bucyrus-Erie. Then we got bigger drills in the early forties, which made twelve-inch holes. But they were still churn drills. The rotary drills came in after the war. We started to use those. Now, of course, everything's rotary.
- Swent: You weren't using the kind of equipment you would use in an underground mine, then?
- Fenzi: We used air drills to break rock boulders, and we'd get a certain amount of hard ground where the blast holes hadn't--we had to go in and drill with an underground type, air drills. Then we used caps to set those charges off. We would have separate crews for that, to do what we called secondary blasting.
- Swent: I guess your drilling and blasting when you're doing an open pit is an entirely different thing from underground drilling and blasting, isn't it?
- Fenzi: It is, except in this case of the Utah, Bingham Canyon. They used to use underground liner drills and drill air-drilled holes in the toe of the banks. And spring those holes, which--you know about springing holes?
- Swent: Well, I'm not sure--
- Fenzi: You would shoot a small charge to expand the hole--after you drill the hole, you'd put a small charge and then maybe half a stick of dynamite, shoot that to make a bigger hole. Then you could get more dynamite in the hole next time.

- Swent: Did you do any of that?
- Fenzi: We only did it occasionally, when we got what they call a high bottom, you had to take it down to the level of where you want the level to be established. So we used these air-type liner drills. When we got big rocks sometimes, we had to break those up. We drilled those with jackhammers. So to that degree, we used some of the same equipment they used underground, but our main drilling was using churn drills.
- Swent: Were you removing overburden or were you beginning with ore from the beginning?
- Fenzi: Up until 1942, we were moving overburden.
- Swent: Five years before you even got to the ore!
- Fenzi: Well, we had gotten to ore here and there. We ran a test mill operation, a big one, two or three thousand tons a day in one of the old mills that was there in Morenci. We mined a portion of the pit to test equipment for the new big mill. Mr. Plato Malozemoff--
- Swent: Was this the test that Plato Malozemoff ran?¹
- Fenzi: I don't know, but his father had a design of some flotation equipment. I met Plato first in Morenci. He had come to supervise the testing of those flotation cells his father designed in our test mill in 1939. He was there on occasion. We tested all kinds of equipment, various ball mills. We ran, as I say, about three thousand tons a day of pit ore which we hauled up from the trucks to the old mill.
- Swent: This was in '38, as early as that?
- Fenzi: We started the old smelter up and smelted the concentrate. We didn't do any testing of the smelter. We just operated to treat the concentrate. That was 1939.

Assistant General Mine Foreman, 1942

- Fenzi: The next job I got was to be the assistant general mine foreman. In the hierarchy of the mine, we had a mine

¹Plato Malozemoff, *A Life in Mining: Siberia to Chairman of Newmont Mining Corporation, 1909-1985*, Regional Oral History Office, University of California, Berkeley, 1990.

and then we had a mechanical department. Three departments, basically. I moved over into the operating department as assistant general mine foreman. I started as drilling and blasting foreman in the mine, then went over into the general operations. We had a lot of the collateral things that the crew had to do with--haulage, track crews, operating crews.

Swent: What did each of these changes involve?

Fenzi: A slight raise in pay.

III WORLD WAR II AND A GREAT DEMAND FOR COPPER

Fenzi: That's where I was when I resigned to join the navy. I had been there about a year in the job as assistant general mine foreman. As I say, they thought that they could spare my services enough to let me go into the navy.

Swent: You had been deferred until then, I presume?

Fenzi: I was not only deferred, but you couldn't leave.

Swent: Right. It was an essential employment, wasn't it?

Fenzi: That's right. You had to have permission to resign, unless you--

Swent: So you were frozen in it.

Fenzi: Frozen in it, yes. As you may remember, they froze the price, they froze the wages. Unless you moved from one job to another job, then you got the wage for that job. But you couldn't get a raise in the job you were in, and neither did they raise any of the categories, couldn't be raised during that period.

Marriage to Eleanor Leeds, 1940

Swent: By then, you had also become married.

Fenzi: I was married in 1940, to Eleanor Leeds, in Pasadena, California.

Swent: So you moved out of the staff house.

Fenzi: Moved out of the staff house and into one of the small houses.

Swent: What were they like?

Fenzi: They were a two-bedroom house, an individual house. They had two bedrooms, bath, kitchen, combination living room and dining room. They cost us twelve dollars a month. Of course, I was making about 150 dollars when I was married. We lived on about forty dollars for food.

Swent: Was the house furnished? Did the company provide furniture?

Fenzi: No, it was unfurnished.

Swent: Where did you get furniture?

Fenzi: In my case, we bought some in California and shipped it out there. Other people could buy it at the company store, you could buy it in stores in nearby towns, or in Phoenix. A lot of people bought furniture in Phoenix. Or El Paso; that was really closer. A lot of people shopped in El Paso.

Swent: Of course, once the war started, you didn't have gas and tires to do a lot of driving, did you?

Fenzi: No. We had an "A" card which was a very small amount of gas. So we did a lot of walking. However, I did have transportation to my job in the mine. I would go back and forth to work in a company vehicle. But no, you didn't take trips. I remember coming to California and getting special extra gas to drive out to California one summer, not over forty miles an hour.

Swent: What kind of car did you have?

Fenzi: I bought a second-hand Buick in 1938. When I went to work in the mine drilling and blasting I had to use my own car on the job. I used my own car up until about 1941 in the mine, which wasn't very good for the car. I got paid an allowance, I think it was ten cents a mile.

Swent: What led you to join the navy?

Fenzi: I don't know. I guess I wanted to get into the more active--well, going back to the war: prior to 1941, when the draft took place in 1940 or thereabouts, a number of state national guard were put into the service, as you may remember.

Swent: I certainly do.

Fenzi: One of the groups, a group from the Silver City area, New Mexico, nearby. There was quite a contingent went over to the

Philippines in the Corregidor thing, in the death march. Anyway, when Pearl Harbor hit, quite a number of people immediately went out and volunteered and joined the service from Morenci. It was mostly single men, but there was quite an exodus. By the first of 1942, they were noticeably reduced in people.

February, 1942, and the New Expanded Mill

- Fenzi: Also in 1942 was when the mill started, February 1942, the first ore went through the mill. We were first in production, and it was very important production because it was a big step up in the capacity of the United States. Almost immediately, the government wanted us to expand. We got started and left one end of the mill open for the expansion.
- Swent: Yes, but we have to get--the RFC, the Reconstruction Finance--
- Fenzi: No, not the Reconstruction. This was the--
- Swent: Defense Plant Corporation.
- Fenzi: That's it, the Defense Plant Corporation, but you mentioned it briefly there. But the twenty-six--
- Swent: It is in our notes, but it isn't on the tape yet.
- Fenzi: They asked Phelps Dodge to start expanding the mill right at the time they started up because of the war. We were just starting up in 1942, February. We then had to immediately move into expanding the thing, and we--
- Swent: So it was expanded from the very beginning, then?
- Fenzi: It was expanded almost from the beginning, or started to expand. They started production at 25,000 tons per day, and the government financed the expansion to 40,000 tons per day. The mine had to start building up. Plans were laid out for expanding the mill. Although it took about a year and a half to get the expansion finished. It really just continued, and Bechtel, who had done the first job, came back to do the expansion.
- Swent: They did the construction?
- Fenzi: Yes. The design engineering firm of Anaconda, Mr. Wilbur Jurden, did the design, which they had already done for the

first part. Then the main problem was getting labor to run, and the rest of the time during the war we had a shortage of labor.

Swent: Both in the mine and the mill?

Fenzi: Mill, mine, smelter, everywhere. There were various efforts made in different areas.

Running the Mine Around the Clock

Swent: How did this affect you in the mine?

Fenzi: It affected us in this respect: we went on a seven-day schedule. For a while we had--

Swent: And were you working twenty-four hours a day, three shifts?

Fenzi: We ran the mine twenty-four hours a day, three shifts. We originally started up with three shifts with a swing crew, we called it, which filled in the deficit--everybody worked six days a week. Then there were enough men to make the mine run seven. Well, as time went on, the people to do this shift work, swing shift, we ran out of men. So people would work seven days a week and even work double shifts. In other words, a shovel runner would run eight hours, and then he would run another eight hours. Double shifts. The period there toward the end of the war, we had a lot of over time, people double-shifting.

Swent: Did this affect safety?

Fenzi: No, not too much. It did not. They were tired.

Swent: I should think so.

Fenzi: Our safety record didn't suffer. Obviously, some of the bad accidents might have--we had bad accidents once in a while. But during that period it was not any worse--it was still a good safety record.

Recruiting Jamaicans, Navajos, Wives

Fenzi: There was a group of Jamaicans who had been brought over to this country from Jamaica for some operations down in the South, I don't know where. Anyway, they sent a contingent out to work for us. They were mostly labor brought there, and they worked on our track crew, not for a long period of time, but for a period. They spoke a British-Jamaican mixture, colorful people.

Then we had the Indians, the ones I mentioned at dinner. We recruited Navajo and Hopi Indians from the reservations, and they came. We had fairly large contingents of those, I guess up to as many as 300. Most of those worked in the mines. Some worked in the smelter.

Swent: Were they good workers?

Fenzi: They were good workers. They didn't have the feeling that they should work beyond what they needed to satisfy their need, such as a new saddle or a new horse. So they would come for a period and then go home. So most of the so-called periods were for two months. Some would stay, and some would go home. Some stayed on permanently; a few of them stayed on indefinitely and did other things. They worked in the smelter and in the mine also.

Then we started hiring wives of employees in the mine and the mill, more in the mill than in the mine, a few in the mine and a few in the smelter. Day work, physical work, distinct from some that had worked in the offices always.

A Big Railroad Operation

Swent: I want to be sure I am clear on this track crew. When you speak of the track, you mean the track that was in the mine?

Fenzi: Yes.

Swent: It was a railroad operation in the mine. But you also had track going from the mine to the--

Fenzi: To the mill and to the smelter, and down to the--

Swent: And from the smelter to the refinery?

Fenzi: Well, the track went down the hill to Clifton where the Southern Pacific picked up the freight, from Clifton which was down the hill from Morenci about six miles by train.

Swent: You no longer ran your own track to El Paso?

Fenzi: No. We had merged our railroad with the Southern Pacific back in the 1920s.

Swent: But you still did have a lot of track, didn't you?

Fenzi: We did at that time.

Swent: How many miles?

Fenzi: There was about 125 miles of track in the mine and the mill. The track operations ran until fairly recently. We abandoned the track operation in the late eighties.

Swent: As late as that?

Fenzi: We went into bigger trucks in place of the railroad, and put the conveyors in the mine and crushers in the mine. So it's now a different operation. But up until about 1989, it was a railroad operation.

Swent: So in the forties, you were operating with this large amount of track?

Fenzi: Large amount of track, and operated that way all the way up until 1989.

Swent: Was fuel a problem?

Fenzi: No. We, of course, converted to diesel, our trucks and locomotives and bulldozers, etc. were all diesel.

Swent: Before the war?

Fenzi: About the time of the war. Our new trucks we bought--

Swent: I am thinking of before you went in the navy. We are talking now about the early forties.

Fenzi: We started to buy diesel trucks and diesel locomotives. In fact, we had a few diesel motors bought for trucks that haul from the mine to the test mill. So we started to replace the twenty-two-yard trucks which we had. The new ones that we bought were diesel-driven.

- Swent: I am unclear about the trucks. Where did the trucks come in, in addition to the track?
- Fenzi: All the initial stripping was done by truck haulage. We installed the railroad--
- Swent: In the pit?
- Fenzi: Yes--during the stripping period, and had the railroad running by the time the mill started up. We were starting to haul material out of the pit before the mill started up for about a year, on rail. But the initial stripping and opening of the mine was by truck haulage, to build the railroad grades and so forth. We did go into rail operation a year or two before we got into production.
- Swent: So when you hired, for example, these Indian workers, did you have to do substantial training?
- Fenzi: We trained them on track work. We had to train them to swing a track hammer. Broke a lot of handles during the training. That was always true with new people.
- Swent: Sure. Not just the Indians, but everybody I suppose.
- Fenzi: Everybody. Except for some of the old-timers, who had already been trained--already done it. A few people who had been working for other mainline tracks came in to work for us and had track experience. But most of them were trained on the job.
- Swent: As the war progressed, how did things change?
- Fenzi: The equipment changed periodically. As new equipment was available, we kept investing capital in new mining equipment, more or less kept up with whatever was new. So in the periods after the war, we started picking up new type of trucks.

Before the war, we were pretty much married to this type of equipment. Because of the war, the manufacturers weren't making any new type of equipment, so it carried all the way through the war with equipment we had installed, and repaired what we had, equipment and trucks, etc. Up at the high levels where it was hard to locate rail, we still used the trucks to do the stripping, removing of the waste material. That was true all the way through the war. It wasn't until after the war that we started buying new equipment.

We also experimented with a battery-operated locomotive, which went on overhead trolley power on the main lines to the

mill and the dumps, but it went on batteries on the benches where trains were being loaded, which worked fairly well, but it was hard to keep the batteries charged properly. We had to use a small diesel locomotive at times, to get the engines which would run out of juice on the levels, haul them around to get recharged, but it worked. It wasn't until after the war that we replaced those with straight diesel locomotives, but prior to that time we had this battery-operated combination.

Swent: Who manufactured those?

Fenzi: Westinghouse did all of them.

Swent: Did you have a lot of people coming and going from manufacturers overseeing--?

Fenzi: Prior to the war, yes. When we were building a new plant, which was quite a big plant for this country, one of the first big ones built after the Depression.

Swent: That's your processing plant?

Fenzi: The whole complex. There were some others built during the war in Globe-Miami and places like that, and other parts of the country. Morenci was the first big mine after the Depression in this country. So that was interesting.

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Service in the Navy Construction Battalion in the Pacific Theater, 1944-1946

Swent: I guess maybe it's time to get you into the navy.

Fenzi: Yes. I went into the navy in October of '44 and reported to Rhode Island, Sea Bees, because I had experience in equipment and construction, that kind of thing. I got a rank of ensign. I made slightly more money than I was making when I was working at Phelps Dodge. My wife and two children went back to live with her family in Pasadena. I left in October and went to Rhode Island, a Sea Bee training station.

Swent: Sea Bees stands for Construction Battalion, I believe?

Fenzi: I think so. C and B, Charlie Baker. I joined the battalion which had been in France on the D-Day landing, unloading

supplies on the beach--the 81st Battalion. They came back to the States, and half the personnel was transferred to other units and half were new people in Rhode Island. We then went from Rhode Island in early January to the Pacific by ship out of Rhode Island.

We first stopped in Hawaii for some further training and then went out to Ulithi and into Okinawa. When we landed in Okinawa, we were also unloading supplies to the beach in Okinawa, starting during the fighting. We got there about two weeks after the initial landings. We were there from April until early August. We left Okinawa for Guam to prepare to load out to go to Japan for the invasion of Japan. And fortunately, Mr. Truman dropped the atomic bomb and we never went to Japan.

Swent: You were sort of glad about that?

Fenzi: Yes, I was glad about it. It was going to be a costly--. Extra officers had been added to our battalion because each platoon was going to have two officers and two, either chiefs or first class seamen, because they felt the casualty rate would be pretty high for this particular landing of barges on the beaches to unload supplies for the invasion army.

So we went to Guam. Of course, I was new to the navy and I didn't come home. I went out and did other things for most of that year, and until 1946. I worked on the breakwater in Guam, blasting rock for that. The Sea Bees were continuing the building of a breakwater. The breakwater was started before the war by a civilian crew. Of course, [it was] stopped by the invasion by Japan. The Sea Bees had taken over the rebuilding of the breakwater to build a better harbor there at Guam. I was assigned to that for a while.

Early in 1946, I went down to Truk Island in the southern central Pacific to work on an airfield, supervising the drilling and blasting of rock aggregate for the airfield, widening the runways until I was sent home later that spring.

I went back to Phelps Dodge, but I tentatively looked around a little bit for maybe another job i.e. construction at that time, for a brief period. I decided--I went back to Morenci for they had made such a good offer--I went back as assistant mine superintendent in 1946 and was promoted to mine superintendent in 1947.

IV RETURN TO PHELPS DODGE AS MINE SUPERINTENDENT, 1946

New Mining Equipment

Fenzi: We started buying new mining equipment after the war, increased the size of--we did buy the diesel locomotives to replace the electrics, which gave us too many delays in the operation. That was one of the big changes they made shortly after I returned. Where we needed trucks, we bought bigger trucks. We still had a truck operation on areas which are difficult to access by rail.

Mr. Walter Lawson, who had stayed at Morenci through the war, had the dual roles--chief engineer and mine superintendent. He had moved up to general superintendent. The manager at Morenci was Mr. Lyle Barker, who had been manager at Ajo. After the war, he was sent to Morenci, right at the end of the war. I took over the mine, and another man took over the engineering department. In 1949 Mr. Lawson was transferred to Ajo to run Ajo operations, where he had come from originally, as manager. Mr. Lawson was transferred to Douglas in 1952 as assistant general manager under Mr. Charles Kuzell.

Then I was promoted to general superintendent, which focuses on supervising the operations at the local level. The manager was in charge of everything, and I was kind of in charge of operations under him, of supervising the various--the mine superintendent, mill superintendent, smelter superintendent, and other department heads. I was there until 1957.

Swent: You made this change in 194--?

Fenzi: I was mine superintendent in 1947. I was general superintendent in 1949, September. Then I went down to Douglas to assist Mr. Lawson in 1957, in September. Mr.

Lawson had become general manager when Mr. Charles Kuzell retired that year.

Swent: From 1949 to 1957--

Fenzi: I was general superintendent.

Experiments with Vat Leaching

Swent: Right. Were there any major changes then in equipment?

Fenzi: Not a great deal of change of equipment. We did run some experimentation which was kind of interesting. Going back to Dr. Ricketts: as I mentioned, he designed and had built the leaching operations at Ajo. They started Ajo in 1910 or '12, in there. A Mr. Ben Cody from Morenci, who had started in Morenci in 1908, went down to Ajo and ran the vat leaching plant at Ajo. Mr. Cody came back to Morenci as mill superintendent in 1938 to run the test mill in 1939 and the new mill which started up in 1942. He was there when they built the mill, watched, supervised the mill construction and ran the mill in 1942.

In the early 1950s we again experimented with vat leaching. He had an assistant who could run the mill, so we had him run a pilot plant experiment on possible leaching, vat leaching of certain ores that we had.

Swent: Were the ores at Ajo and at Morenci similar?

Fenzi: No. The leaching ores at Ajo were surface ores which had been oxidized. They were the ones that they had leached in the early period, highgrade oxide ores. I guess they treated about 2,000 or 3,000 tons a day by vat leaching. The ores at Morenci had a little oxide, but they were mostly chalcocite, which is a copper-iron sulfide. They are soluble, a relatively soluble mineral. It oxidizes readily, put it that way. All other ores are chalcopyrite such as Ajo, which is also a copper-iron-sulphur, but it has only one--it is not as soluble, basically. It doesn't oxidize easily. It isn't readily leachable.

Swent: Those are the ones that you have to smelt?

Fenzi: Well, float. That is why Ajo went to flotation. When they ran out of leach-type ores, they had to move into flotation. They were in the flotation mode in the 1920s. But Morenci had

a type of ore that was amenable to leaching by using a ferric sulfate addition to the mixture. Anyway, Morenci in the 1920s had debated seriously about whether to put in a flotation plant for floating the material or a leaching plant to leach the material. They had run many studies, and Mr. Ben Cody had been one of those involved in that, but he was also a good flotation man. He was running the mill at Ajo for many years.

So we went back again to experimenting with leaching. We ran a pilot plant for that for a number of years. It had some advantages. One is better copper recoveries on Morenci ores. Another is that the solutions from the vat leaching operation could be converted directly to high quality copper without going through a smelting process by electrolyzing the solution. So it is a cheaper system. That is what we are doing in many places today on certain leach solutions S-X systems. But Mr. Cody had quite a background in leaching. In fact, he had gone to Tyrone after they had shut it down in 1921 and conducted a test vat-leaching pilot plant back in the mid-1920s.

So in the back of Phelps Dodge's mind, this leaching thing was kicked around--I get my times and places--. We ran that experiment successfully. We didn't know where we were going to apply it at the time. Although there was some thought of an expansion to Morenci, as mentioned later, vat-leaching was considered again for Metcalf and turned down in 1972 because of production bottlenecks in the leaching operation, and higher capital costs.

Leaching is a pretty fixed production system, because you have to put the crushed ore in a fixed container. You are limited to that container, and then the only other limitation is how fast it takes you to leach it. Once you've established that, then you're stuck, as they say, with a fixed amount of capacity.

Whereas a flotation circuit system, you are altering the degree of grind, in other words, how fine you grind the material. You can change the capacity of the system. Also adding units to a flotation capacity plant is easier than to a vat system.

Swent: This is all vat leaching that you're talking about?

Fenzi: All vat leaching, yes. The cost of building a vat leaching operation is somewhat higher than a flotation operation. So the vat leaching idea pretty much had died as a system to be used, although occasionally it shows up for certain deposits.

They have gone into what we call heap leaching, which is what they use in some places today, like Yerington.

Swing Crews are Difficult to Supervise

Swent: The Korean War began while you were general superintendent. Did that have an effect?

Fenzi: All we did was run full-out. Phelps Dodge, at least when I was involved in the operations, and later in New York, we developed a system where we didn't want to have swing crews in the mine or the mill or smelter. This was a poor operating mode because of the swing crew; just a few men go into the crew every day and perform work here and there. Supervision of that type of a crew is difficult.

It was a pretty standard system used in the mining industry for changing work schedules. For example, you could work your mine five days a week, or six days a week, or seven. During the war, we worked, as I told you, particularly short of people. We worked more or less a seven-day schedule, and of the crews that we had that still had extra people, we would put some in what we'd call a swing shift to permit people to have a day off a week. In more normal times, you have enough crews to let people off two days a week. They would work a five-day week, but not in sequence.

Swent: And this was a regular eight-hour shift?

Fenzi: Yes, and then you ran your operation twenty-four hours a day, seven days a week. But characteristic of the industry, when prices go down and copper is in oversupply, in the United States, at least a lot of companies cut back from a seven-day schedule to a six- or to a five-. Right after the war, we had that kind of a situation where copper prices went up momentarily, then went down again. In 1949, especially in the spring of '49, the prices of copper dropped; there was an excess of copper. We dropped down to a five-day week. In fact, we started to cut back in addition to that.

Swent: Did you lay off the women?

Fenzi: No, we didn't lay them off. Those who wanted to stay, stayed. We didn't hire any more women, although there seems to be some difference of opinion, but I am pretty sure it was, because women worked for us long after that. Some of the last of the women went to retirement before they retired when they were

sixty-five years of age. Nowadays you don't have to do that at sixty-five, but then that was considered retirement. You got your Social Security and mostly automatically retired at sixty-five. Anyway, a number of the women did stay on at the mill particularly until they reached retirement.

The Postwar Need to Build up Stripping Ratio

Fenzi: There were two things we had to do in the mine after the war. One was we had to build up the stripping ratios again, which means that we hadn't removed the amount of waste that we needed to keep an efficient operation. In other words, we needed to raise our ore availability--we were circumscribed during the latter part of the war due to not enough crews. One of the things we had to do was pick up our stripping ratio, we called it, the amount of waste we stripped per ton of ore. We had done that in '46, '47, and into '48, working at that time still a lot of six-day schedules in the mines. The second thing was to upgrade some of our equipment--new large trucks, diesel locomotives, bulldozers, etc.

By '49, the price of copper had dropped and there was a minor recession on in the United States, at least in our business. We even had to start cutting our crews again back to a five-day week. This meant that the swing crews were all laid off. And then we had to make other changes where it seemed possible to save some money, both on people and on activity.

The Korean War and Increased Demand for Copper

Fenzi: But in '49 in the summer, we had the Korean War start, in August of '49. This immediately started a demand for copper for war uses. After the Korean War, we generally only had changes in times and schedules for our operations at the mines, whether it was a seven-day week, a six-day, or a five-day week. We changed the schedules for the men and the women rather than add crews and take crews off every time we had a shift in schedule. A man would work first five days, then six days, then we went to a six-and-a-half-day schedule, twenty-six and two (twenty-six days worked and two days off), we called it. We did that when peak demand was high.

Swent: How were these decisions made? Who made them?

Fenzi: I think it was made in Arizona; our general manager and vice president in charge of western operations made those decisions. New York would call the shots on whether they wanted to cut back production or not. That was a decision made at the chief executive level. But the method of scheduling was done at the general manager's level.

Swent: So you were just following a decision handed to you?

Fenzi: A general manager's level decision. I think we recommended this shift of using our people rather than laying people off and putting people on, which was always a problem, especially living out in Morenci where you have to either recruit people or lay them off. Following the Korean War, we operated that way pretty much up until present time.

Swent: We're skipping a whole bunch of years in here.

Fenzi: It went that way up at least through the sixties and then to the seventies, that's how we operated.

Anyway, getting back to the Korean War, it didn't affect our manpower particularly. There wasn't that great a demand for people in the military, as you know. A lot of people were called back to military service, including some of our own people. But there was a demand for copper, at least for that period. Then we had a rather quiet period during Eisenhower's presidency after the Korean War. In fact, some people call it a recession, some people call it--anyway, a non-inflationary period up until late '59.

Getting back to the war period, only one thing you ought to mention is the fact that we had the election on union representation during '43.

Election on Union Representation, 1943

Swent: Oh, that was in 1943?

Fenzi: And during the war. We had the election held in each of--not only our company but other companies at about the same time. The Mine-Mill organized the major group which contained--

Swent: It is the Mine-Mill Workers Union, I believe it was called?

Fenzi: This was the International Mine and Mill and Smelter Workers, I think.

Swent: But commonly called Mine-Mill.

Fenzi: Mine-Mill, yes. Referred to in the literature mostly as Mine-Mill.

Simultaneously, the craft unions, as we called them, also voted on representation for their people.

Swent: Which crafts would you have?

Fenzi: The crafts we had, if I remember correctly, were the machinists, the carpenters, the boilermakers, the brickmasons--which was a very small group--the pipefitters, electricians--very important one--and I think--

Swent: Was there an operating engineers at that time?

Fenzi: Yes, operating engineers too. They represented the shovel operators and the bulldozer operators and the drill operators. Then we had two railroad unions, one of engineers and firemen, the other trainmen and brakemen. On an engine in those days, we had a locomotive engineer and a brakeman. One was represented by one union and the brakeman represented by the other. They were both railroad unions.

Swent: And these were all negotiating individually?

Fenzi: When we had negotiations, after original certifications, yes, we would negotiate jointly with part of it, depending on how it worked. On some cases individually with the respective union, but most times with our unions as a group.

Swent: Let's go through the certification process first. You were a superintendent at Morenci?

Fenzi: No, at that time I was assistant general mine foreman in the mines before I went into the service. The election was held before I went into the service, and they were certified before I went into the service.

Swent: So what involvement did you personally have in that?

Fenzi: I wasn't very much involved in that at that point, except that they then drew up contracts between ourselves, Phelps Dodge, and the union.

Swent: Sometimes the union has to stir up some discontent before they get certified. Did that happen?

- Fenzi: No, not particularly. They ran a petition to get names. If you have so many names, then under the Wagner Act you are entitled to an election, and then in turn you have the election. If you have a majority of those that vote, you can be certified. Unless somebody objects successfully in court, why then you are certified to represent that group of employees.
- Swent: Did the company make any effort to prevent certification?
- Fenzi: I don't remember that they did particularly. They certainly checked the list carefully of who voted, but no, I don't remember them trying to de-certify or stop from having a certification.
- Swent: Were the other companies in the area going through the same thing?
- Fenzi: Same thing at the same time. Asarco, (American Smelting), Kennecott, Anaconda up in the Butte area, Inspiration Copper. And Newmont Copper. No, strike that one. They didn't have a mine at that time.
- Swent: Was there an Arizona Mining Association at that time that you were involved in?
- Fenzi: Not that I remember, as such.
- Swent: Were you involved in AIME affairs at all?
- Fenzi: Yes. Most of us were members of AIME. We had a local chapter.
- Swent: I was just wondering where the people from the different companies got together to discuss things.
- Fenzi: We had AIME meetings and we had local--by activity, we had concentrator meetings, smelter meetings, mine meetings with groups from those activities from the different companies meeting at one of the properties. A lot of exchange of information between the mining companies, as you may realize. We had these meetings under the auspices of the AIME, and that was going on in this period.

Then I went off to the service. During that period, when we started up in 1942, a Mr. Gilbert Davis, who had run the coal operations in Dawson, New Mexico, a Phelps Dodge company, was transferred over to be manager at Morenci, branch manager. Mr. Wittenau stayed on as general superintendent where he had been during the development period. Mr. Walter

Lawson stayed on as chief engineer and as mine superintendent. One of the concentrator people that I mentioned, Mr. Ben Cody, became concentrator superintendent. And then we had a smelter superintendent, Mr. Larry McDaniels, who was transferred up from Douglas smelter to run the smelter in Morenci which started in February 1942 also.

##

Swent: You were just saying that after the union certification--

Fenzi: Mr. Davis spent a good deal of time on two things. The first involved writing the contracts for the unions. We had elections in three of our properties simultaneously: Ajo, Morenci, and Bisbee-Douglas.

Swent: And they are all quite widely separated.

Fenzi: Then we bargained jointly with our union for all three properties at the same time, not individual properties. But we did not bargain with other companies jointly. Mr. Davis helped write the contract with the union and unions. After that, when they started having grievances under the contract, he would be involved in those hearings on the grievances. He was tied up for a while getting used to this different relationship between our employees and ourselves. It took quite a bit of his time.

Swent: How did it affect you?

Fenzi: I was away in the service when they went through this. I came back after the war in the spring of 1946. By the time I came back after the war, it had pretty much become routine--the workers knew what the contracts stood for, supervisors knew. We continued to have grievances always, but we knew better how to handle the mechanics of handling grievances, the hearings and so forth.

Better Handling of Grievances

Swent: What were the types of grievances?

Fenzi: The obvious one was somebody got fired, they had a grievance. They would raise a grievance about it, and we had hearings, go through the procedures.

Swent: Did you ever fire anyone?

- Fenzi: Yes. But go through the procedures. If it seemed our labor contracts had no-strike provisions with rights to arbitrate, then the union had the right to arbitrate, and we would arbitrate. The arbitrator's decision was final. So sometimes people were reinstated and sometimes they weren't.
- Swent: This is all the Wagner Act, or the NLRB procedure?
- Fenzi: Yes, that was part of the then Wagner Act. Then they had the Taft-Hartley Act which amended the Wagner Act after World War II, and today the combination Wagner Act and the Taft-Hartley Act with some minor modifications by subsequent legislation is in force.
- Swent: I was just wondering if you recalled any particular instance that was different.
- Fenzi: There were two differences. Contracts were somewhat different with the railroad union than they were with the other unions in this respect, that the railroad union had a history, and they took rules from the railroad labor contracts. That you could suspend a man for something, but in doing so, you then immediately had a hearing. Under the other terms of the other contracts, you could suspend a man and they could have a grievance, but you didn't have a hearing, so to speak. Do you get the difference?
- Swent: Yes. I was wondering if you could illustrate with a particular example. Can you remember a specific instance of someone that you--
- Fenzi: I remember one time when a railroad man on one train hit another man with his throttle handle, got in a fight on the job. And they suspended him, of course, had a hearing, and fired him. After the hearing--you were suspended until you had the hearing with their representatives, and the man, and your people, and so forth. That's an example of one instance.
- Every time you had an action with the railroad, you had a hearing. An individual--mine-mill, or carpenter, electricians, the foreman took the action and then you have a grievance, if the union or the man wanted to raise an objection to your decision. Sometimes it was reinstate even in those conditions and so forth. But it was up to the foreman to act, the man in direct charge.
- Swent: And you were superintendent by then?
- Fenzi: By that time, when I came back after the war, I was the superintendent. So I held all the railroad union hearings.

They were held at the superintendent level. Whereas the initial action by a foreman was at the foreman level.

Swent: Did the foremen consult with you first?

Fenzi: No. Well, they had rules. In fact, we had fairly specific rules for the things that were verboten.

Swent: What I am trying to get at, I am trying to trace through your career, how your viewpoint and responsibilities changed as you--

Fenzi: Before I went into the war, if I had occasion to fire somebody, if it was a guy working for me, I would just be responsible for him, take whatever action I deemed proper. We didn't have too many cases of discharge. If you had the case of somebody who didn't want to work, finally after a few warnings they would get fired. Or if we had the case of somebody coming to work drunk, which was a dischargeable offense. Then you had the case where people didn't report for work. In other words, they just didn't show up. You didn't fire them, but you suggested that next time they show up and give them a few warnings.

This became much more stereotyped after we had our union contract. We had a formal warning slip and so forth, so that we had a paper trail. We tried to train our foremen on how to handle labor matters, relations with employees. I would say in general we were reasonably objective, I thought. I always thought we were objective. But obviously there were cases where that wasn't true.

One man wanted to go in the service, I think. He wanted to leave, anyway. Of course, under Government rules during the war, you couldn't leave without the general superintendent's approval. This man came up to one of our shift foremen and knocked him down. He got fired. Three years later, he came back to apply for a job and they weren't very sympathetic. But that was very unusual.

Swent: You think he just wanted to join the service?

Fenzi: He wanted to leave. I don't think he liked this foreman anyway, so he took the opportunity. He wasn't thinking too much about the future consequences. But in general, on the job and around the job we had very few problems. We only had whatever came up just before we were having negotiations, we had more grievances by the union. Our bargaining with the union was more--not bitter at all, but it was aggressive at that time. Not all of us went down to bargain. The

bargaining was done at Douglas, where the general manager's office was. Union representatives and our labor representatives would meet down there, and some of us were called in from time to time for comments. Sometimes we would go down to meet, but most of the time we didn't handle the bargaining with the labor unions.

Swent: We are still--

Fenzi: Now we are into Korea.

Swent: --in the Korea period, yes.

Supervising Development of the Tyrone, New Mexico, Property,
1949-1958

Fenzi: I was thinking of one other thing that happened then. The Tyrone property, which I mentioned to you, which was operated during World War I and was shut down afterwards when copper prices dropped, had always been a potential candidate for an open-pit development. So in '49 we started drilling in detail the ore body over there in Tyrone, which is near Silver City, which is about 100 miles from Morenci, due east. Morenci branch was in charge of doing the drilling and started to make the mining studies, plans.

Swent: Is it similar ore?

Fenzi: Similar chalcocite ore. A mixture of chalcocite, some very little chalcopyrite, some oxide, but not a great amount. It started to--then Mr. Lawson left to go to Ajo. I took over responsibility for that activity.

Swent: Tyrone as well as Morenci?

Fenzi: Well, there wasn't much of an activity, the drilling--we had a couple of engineers over there and a drilling program. The local people had a man over there in charge of overseeing the drilling. I went over and supervised to the extent necessary. I did that all the way through until I went to New York in 1959, because Tyrone was studied then, but the decision to open it was not made until the late sixties, but we did the initial drilling and planning in the fifties.

Revising Southern Peru Copper Company's Mining Plan, 1954

- Fenzi: Then about '54, Mr. Cates I guess met with the Asarco people, the Newmont people, and the Cerro [de Pasco] people, primarily Asarco. They agreed to get together, which later became Southern Peru Copper. Mr. Lawson was called in by Mr. Cates to look at the plans that had been drawn up for the pit development and the ore body. He was representing Phelps Dodge, and was very critical of the mining plans.
- Swent: How did you know this?
- Fenzi: I knew it--[laughs]--he told me right then. In fact, he got the job of new plans as a result of his critique; he came back from New York and put together a group of people from Phelps Dodge, engineering staff people, to work on new mine development plans.
- Swent: Who were these people?
- Fenzi: Mr. John Lentz, mine superintendent at Ajo, myself, the chief engineer at Ajo named Mr. John O'Neill, and a man from Bisbee, an engineer named Kenneth Johnson.
- Swent: So this is how you knew that he was critical. Where did you meet?
- Fenzi: We met at Douglas, called over from our respective properties. John O'Neill and John Lentz were down in Ajo at the time, and of course Mr. Johnson was over in Bisbee.
- Swent: It is interesting that you refer to all of these people as "Mr." Did you not use first names in those days?
- Fenzi: Not too often, only when they asked you to. I never called Mr. Lawson "Walter" until much later. The first twenty years, I guess I called him Mr. Lawson.
- Swent: Did he call you Mr. Fenzi?
- Fenzi: No, he called me Warren. In my generation, there were a lot of people that didn't call people by their first name unless they were asked by older people.
- Swent: But this is a significant change, perhaps.
- Fenzi: There's been a change in that. I can't quite get used to the ladies at the bank calling me "Warren," who are about my granddaughter's age. I don't mind it too much, but it's--

- Swent: [laughs] No, it is different though. It is just different. So, Mr. Cates you always called "Mr. Cates"?
- Fenzi: I always called him Mr. Cates.
- Swent: What did he call you?
- Fenzi: Warren.
- Swent: Did he come to Douglas for this meeting?
- Fenzi: No. It was put in charge of Mr. Lawson. At that time, Mr. Lawson had been moved to Douglas as an assistant to a Mr. Charles Kuzell, who was general manager and vice president following the death of Mr. Lavender, I believe around 1951. Kuzell and Lawson went to New York at the request of Mr. Cates to meet with the Asarco people. As I say, Mr. Lawson was quite critical of the plan, and we were too.
- Swent: Why? What did you not like about it?
- Fenzi: Well, very simply and clearly, what had happened was that the man that was--
- Swent: Excuse me, I guess this was the Toquepala, and they had already begun--
- Fenzi: It was Toquepala.
- Swent: But they had their plan?
- Fenzi: They had a plan, and they were trying to get financed.
- Swent: This was in southern Peru.
- Fenzi: Around 1954 or '55. Ultimately, as a result of trying to get World Bank financing, they got these other companies involved. It is a little more complicated than that, but that is told pretty well in Mr. Arthur Hall's story. Newmont and Cerro had a copper deposit in the same area of southern Peru, but Phelps Dodge was invited because it was the only one in the group with open pit mining experience.
- Swent: Yes, but we don't have Mr. Hall's story. [Arthur C. Hall, Nothing Down, Mostly About Mining and Those Involved, Sundance Press, Tucson, Arizona, 1992]
- Fenzi: Initially, Asarco was trying to develop their property (Toquepala) on their own. It was quite an expensive thing to do, and they wanted the World Bank, or a subsidiary of the

World Bank, to do a part of the financing. The World Bank wanted more mining companies involved before they would do any financing.

Swent: How did you know all of this?

Fenzi: At the time when we were invited, I became knowledgeable because I was involved in the mine planning part of it. I helped make up the plans with the other members. I was the one that took them to New York with Mr. Lawson to present them to the group, in late '55.

Swent: I see. It took you a couple of years to make them up, then.

Fenzi: Well, that's my problem with the dates, it didn't take that--well, it took us six months. In those days, they didn't have computer calculations. Phelps Dodge (Walter Lawson) also insisted on running some shafts and test holes on the Toquepala deposit to verify the earlier drill assay results which was also done and checked the earlier results.

Swent: You didn't have faxes, either.

Fenzi: Well, the faxes weren't so important, but the computer calculations are. You had to measure--draw up the maps, measure the areas, make the plans, make sure you had what you wanted, change them. What we did, we started as if from scratch, and made a set of plans which we would recommend for that property (Toquepala).

Swent: Did you go down there and see it?

Fenzi: No. Mr. Lawson went down.

Swent: You were working entirely from--

Fenzi: I was working from maps, which were quite good maps, what we normally worked from for our own operations. And of course, in our systems which we had learned, at Morenci our systems mapped a new plan for ten years every year, another ten years, as a minimum. Sometimes twenty, but mostly ten. It takes quite a bit of forward planning in an open pit to make it work smoothly and continuously. Anyway, that was what was being done in the middle fifties.

As far as Morenci itself, except for some improvement that I mentioned in the locomotives, the drills in the mines, bigger drills, and bigger trucks where we needed trucks, and changing to diesel. Those were the major equipment changes. In the mill, we added a couple of ball mills during that

period. It took the twenty-eight that were there originally to thirty.

Swent: This was just an enlargement; you weren't changing the system?

Fenzi: No, just an enlargement; then we made some other changes. Mr. Lyle Barker was a metallurgical expert, and he made some slight changes in the flow sheets during that period to improve recoveries. We made a lot of minor improvements here and there, but none of them were earth-shaking, but it did materially help the overall efficiency.

Swent: Let's see, 1952 was the Paley report. I don't know whether that had any impact?

Fenzi: That was talked about, of course, in the AIME circles. I don't know--I looked at it briefly, I never studied it in depth except the major effect there was--somebody took the rate on which minerals were being found--the Paley people--and the rate they were being consumed. Of course, out there somewhere the things met, crossed, and so there was a period--that somewhere out about 1980, the world would run out of ores, minerals, metals, and that was the essence of the report, as you've probably heard.

Swent: I have heard about it, yes. It had quite an effect, did it?

Fenzi: It had some effect in some areas; it was political. I suppose it influenced some political decisions, but I don't know how much credence was given to a lot of it. It was a mathematical projection. Obviously, if you make fixed assumptions, it is going to cross somewhere.

Swent: It turned out not to be true.

Fenzi: Yes, that's right. Metals in nature are a depleting asset. The metals and minerals that we used during the war are gone, although part of them are still running around as scrap.

Swent: Copper particularly is saved a lot, isn't it?

Fenzi: A lot of it is recycled, more and more, and makes up twenty-five percent of copper consumption in the U.S. The growth of use and demand didn't check with Paley--it was greater than they said. But the finding of new deposits worldwide was much greater than they predicted.

The Cottrell Plant: Economic as Well as Environmental Benefit

- Swent: We haven't mentioned the Cottrell plant.
- Fenzi: I don't know about that, because we put Cottrells in our smelter when we built it in 1942.
- Swent: Yes, but this is an environmental protection.
- Fenzi: Well, partly so, partly--
- Swent: Didn't use those words at that time, but--
- Fenzi: No. Well, to get into that--the major environmental problem of the copper industry was the smelter smoke. There were other problems, too, lesser problems, but the smelter smoke was--. We wanted to recover the dust in the metal smelter smoke so we put in Cottrells.
- Swent: Why did you want to recover it?
- Fenzi: Because of the mineral in it--copper, other minerals. Some of them would end up in the Cottrell rather than in the slag or in the--
- Swent: So it was an economic--
- Fenzi: It was economic at that point when they built the smelter to recover those particles. But that technique could be expanded to have further recovery. You put--a Cottrell first is an electrostatic precipitator, and then beyond that you start with a baghouse where you put the gas through a series of bags like a vacuum cleaner; they're porous, and the fine dust particles are picked up in that particular method. So you end up with a fairly clear smoke, at least clear of dust particles. We couldn't do anything about the SO₂, which is the gas itself. And when it comes out of the bags, you have to start converting it, chemically, over to something like acid so you treat it--go through an acid plant system, which is what we do now in the smelters, make acid, sulfuric acid.
- Swent: But you didn't come to that until later.
- Fenzi: We didn't do that, except where we needed the acid. We had an acid plant at Douglas smelter back in the thirties. It was a way of making acid, but not for environmental reasons as much as to recover the sulfur for acid. So, the Cottrell plants were not, although they did reduce the particulates coming out

of the smelter, they were put in for an economic reason at the time of the construction.

The way they treated SO_2 gas was a little like they treated the sewage in New York City. When they built the New York City sewage system, they built it to be diluted by ocean water. What they did was dump it in the river and the ocean. It was fine until the volume got too high. Then they had to think about treating it separately, but not until the late 1960s. In California, at least in Santa Barbara, they started treating the sewage at the source in the 1920s. The clarified material, which is pretty well cleared up, is then put in the ocean or wherever. Nowadays they even clean up further and reuse it--in Santa Barbara, at least--in the parks for irrigation water.

Anyway, in the case of sulphur smoke, what they did, they built the stacks to dilute it, so when it went out in the air, it was very much more diluted than it was in the old days.

Swent: The first effort was making the stacks higher, I think.

Fenzi: Partly that, and putting more air into the stream. So back--you've seen about Ducktown [Tennessee] and so forth, where it ruined all of the vegetation, well, that smoke came out very strong--roasters that were used in those days which emitted a very strong SO_2 gas, ten to fifteen percent. When they built the Morenci smelter--no roasters--the SO_2 gas was diluted in the stack to less than one and a half percent concentration. At this concentration in the mainstream of the air, or smoke, very little damage to plant life occurs.

Swent: Of course, you didn't have forests around there anyway much, did you?

Fenzi: No, we do have pine forest fairly close. The interesting thing about that part, the trees never showed damage, and you can go into this with some detail, but the part of that is in the western United States, because the air is so dry, there is no formation of--well, two things happened in the smelter at the time, let's say 1950. It diluted the smoke, so you didn't have high concentration of SO_2 . There still was some dust in the smoke which was a basic alkalinity type of dust particles from the lime and things that were in the smelter concentrates which acts as a neutralizer. Around Arizona, you never could really show very much damage. At Douglas we had a department which traced damage to crops in the area. But Douglas had roasters and higher SO_2 concentrations in the smoke from one of their stacks.

Phelps Dodge and Concern for Environmental Protection Since 1920s

Swent: When did this begin?

Fenzi: In the 1920s. We would pay farmers if there was damage to their crops. Certain crops are very susceptible to any excess SO₂. One of them was peppers, on both sides of the border, and that were raised in the area. So we had our smoke department, as we called it, that visited on the farms, examined plant damage to farmers' crops, and ran a farm where plants were exposed to controlled amounts of SO₂ gases concentrations and evaluated damage. We paid farmers for the damage to their crops.

Swent: Even into Mexico as well?

Fenzi: Into Mexico.

Swent: Of course, Douglas is right on the border.

Fenzi: Yes, of course. We used to pay some of the farmers in Mexico.

Swent: Did you really?

Fenzi: If there was damage. It wasn't a large amount. The damage was never really material, but there was damage. One of the things that was damaged was milkweed. The weed that you see around here, it shows up smelter smoke damage, but there was not a lot of damage. At the time, Douglas had a little bit more concentration in their smoke because they used roasters in their system. That let out a slightly higher SO₂ content than the one at Morenci.

Swent: Was there any thought that it was a health hazard to people?

Fenzi: No.

Swent: Only to crops.

Fenzi: We didn't think so. I remember touring the smelter with the superintendent, Larry McDaniels, around Morenci up where there was pretty heavy smoke, I used to sputter with it. He was smoking his pipe. He figured it made the tobacco smell a little sweet if you were in a fairly heavy concentration. You didn't want to be in real heavy smoke, but where you could really taste it and smell it. But I never noticed any lasting ill effect. Our ancestors used to burn sulphur in spring housecleaning back East, especially in the early years, in our

country. The smoke was--and the old matches, when you lit a match, that smell. SO_2 itself, you can't smell it or see it, but the SO_3 , the white sulphur smoke is what one sees and smells. It may make you sputter. I don't know anybody--it's not a poison like H_2S . It will suffocate you if you have too much, but it is not a poison. It doesn't poison your system.

Swent: Did you have any concern in your mine operation when --I am just trying to be specific about you when you were--you were foreman at this point in the mine?

Fenzi: What period are we talking about?

Swent: I am not sure. We have gotten through that Korean period.

Fenzi: Well, after the war, I was general superintendent, which was the operating man under the manager, running the different operations.

Swent: Were there any hazards--well, continuing with this environmental thought for a moment--air pollution in the pit or water--

Fenzi: We kept sprinklers on our shovels, sprayed the banks so there wouldn't be a lot of dust. We sprayed the roads--

Swent: Was this a toxic dust--it wasn't quartz?

Fenzi: No. Well, there is some quartz, but it is not toxic dust if it has enough clay in it, so it is not a toxic dust.

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Fenzi: We kept the dust down so that the silicosis would not be a problem. It turned out to be true. So we did not have what we considered hazards. We didn't have any lead in our ore, so we didn't have any lead fumes. We didn't have any mercury in ore; some of the gold mines had. But no, we didn't have any really toxic-- SO_2 was not a poisonous gas. SO_3 a little more so, but there was so little of it, we never had a case of hospitalization--

Swent: You were in kind of a good situation, weren't you?

Fenzi: I think so.

Water Sources and Protection

Swent: Was there a concern about water drainage?

Fenzi: We collected all our water from our plant.

Swent: What was your source of water?

Fenzi: There were two sources. Initially, it was water from the river, coming in from northern Arizona, where most of our water comes from. Later on there were wells at different places that supplemented our supplies. We had dams and rights to water, so much water out of certain streams.

Swent: Did people downstream ever complain?

Fenzi: Yes, we had litigation over that. But we had developed water rights which were run through the courts and became part of our water rights in Morenci. It was quite a concern, yes. There was never enough water.

Swent: Not in Arizona.

Fenzi: We used quite a bit of water in the process. Then you saved water, recycled all the water. We recycled about--in the mills, about 90 percent of the water comes back to be used again. That's important, yes, at the source. And then we would keep waters from getting down in the mainstream, any of our water from the mine process, keep that out of the mainstream. We would dam up the--in some cases it evaporated or we couldn't do anything else with it. We've been doing that for quite a while.

I guess way back in history we had a court case where we let some water get into the stream back in 1912. So we had a permanent injunction not to have any of our mine water get into the rivers.

Swent: From the mine or from the mill?

Fenzi: From the mine. Those days there was no mill. The smelters first, then finally mills. So it affected the mills too, you need mill water too.

At that point through the 1950s, we took care of dust; smoke was diluted. We cleaned up most of the particles out of the smoke, and that's where we stood in the early sixties.

More About the Toquepala Mine Plan

- Swent: I don't know if you have said all that you wanted to about this critique of the mine plan at Toquepala.
- Fenzi: Well, we just came up with a new plan. The only real criticism was that there wasn't enough stripping to uncover the necessary ore to operate. The original plan got down to the ore body. It was in the canyon, and the ore body kind of followed the topographical contours of the hillside of the bottom, although it was very close to surface in the bottom of the canyon. But to get at it, you had to strip the hills on both sides--mountains really. The plans only showed them getting down to the top of the ore body and sitting on top of this ore, undeveloped, because they hadn't done the stripping to get down into the ore before the mill started. Otherwise we felt you ought to have a year's production sitting there before you started the mill. That was not in the first plan, so we added about--I guess the stripping was 90 million and we increased it to 120 million.
- Swent: Tons?
- Fenzi: Tons.
- Swent: Did you have to argue to make this change?
- Fenzi: I don't know. We presented it--. No, there wasn't too much argument. It was more money, we had to pay for that thirty million more tons of stripping. There was argument about that at the directors' level.
- Swent: What was your part in this?
- Fenzi: I directly supervised the drawing up of the new plans for Toquepala.
- Swent: You did that where? At Morenci?
- Fenzi: In Douglas, and then took it to New York to present to the sub-group, board, for the companies which formed that board. They accepted and added that to the cost.
- Swent: Did you make the presentation?
- Fenzi: I think Mr. Lawson made some of it and I made some of it. I know I made some of the presentation. That's one place where my own theories of open pit mining always put me on the side of more stripping than normally the accountants wanted to do,

thinking they are saving some money for the future. But in an open-pit mine, lack of adequate stripping reduces the flexibility of sources of ore and it is very difficult to operate and produce the ore on a continuous basis.

Swent: I believe you were criticized.

Fenzi: Yes, I was criticized.

Swent: Maybe not you personally, but Phelps Dodge.

Fenzi: I don't know. It was really Asarco's decision, the other two companies. Asarco was the majority owner.

Swent: Right. Southern Peru had--or Phelps Dodge had 16 percent.

Fenzi: Right, we were at sixteen percent.

Swent: But you were the ones with the expertise.

Fenzi: They did rely on us for the recommendation on the mine. We were the only ones running an open-pit mine at the time. Asarco started their open-pit mines just after that at Mission.

Swent: So you were brought in for that knowledge.

Fenzi: We were brought in for the money, partly for the World Bank. The international bankers wanted more companies than just Asarco, so it was partly money and partly expertise. Our Mr. Cates didn't want to get involved unless he was sure that the mining plans would work. He talked the Asarco people into cooperating on that point, even though we were a minority stockholder. But he also took the responsibility for furnishing people down there to start the mine, which we did in a major way. Some of our top people went down there to run the mines.

{Warren Smith, our mine superintendent at Bisbee, was selected to be mine superintendent at Toquepala and then selected general mine foreman. Master mechanics and numerous other Phelps Dodge foremen including skilled mechanics, shovel operators, bulldozer operators, truck drivers, locomotive engineers, etc. were selected as trainers for the Peruvian people being hired. Also Ken Johnson was mine engineer. As a result the mining started efficiently and the Peruvians rapidly attained operating skills which compared favorably to our employees in the U.S. Teaching mechanical skills took

much longer, but through training over the years, Peruvians have learned.}]¹

Swent: When did you first go down--continue to--

Fenzi: The first time I went down was when they had the dedication--1960--after I transferred to New York and I represented Phelps Dodge down there for Mr. Robert Page. The other companies had more representatives present.

Developing the Lavender Pit

Swent: 1960 was the dedication. Before we get up to that, do you want to say anything about the Lavender pit?

Fenzi: Yes. The Lavender pit was started in the late--

Swent: Were you involved in that at all?

Fenzi: To a minor degree. Our chief engineer at Morenci, Warren Smith, at the time, about 1950, was selected to go down to Bisbee and run the Lavender pit.

Swent: So you personally had no direct involvement?

Fenzi: I had a little bit of a look at the mining plans for the pit. It was a much smaller pit than Morenci and the assumed life of ten years, which was exceeded, but it was going to be a relatively short-term operation. It was started in the early fifties and ran until the late sixties.

Swent: I just didn't know whether you personally had much involvement.

Fenzi: Well, I had a little bit to do with it. Mr. Lawson was then back in Douglas, and he had called on different people at different properties to come down. In fact, there was a committee.

Swent: You continued to reside at Morenci, did you?

Fenzi: Yes, until 1957, when I was transferred to Douglas to be assistant to Mr. Lawson.

¹Bracketed material was added by Mr. Fenzi during the editing process.

V ASSISTANT TO THE MANAGER, 1957 TO 1959

Promotion and Transfer to Douglas, Arizona

Swent: I see; then you moved to Douglas?

Fenzi: Then I moved to Douglas, family and all. Then two years later we moved to New York.

Swent: From Douglas then, were you driving out to all these other places?

Fenzi: I did whatever Mr. Lawson wanted me to do. I still was taking care of the supervision of the Tyrone operation, which was nothing more than planning and drilling at that time. I used to visit the properties with him, look at certain things he wanted to study, whatever, for two years.

Phelps Dodge, a Very Small Organization

Swent: That covers a lot of territory.

Fenzi: The operations were actually operated from Douglas, as far as western mining operations. Mr. Walter Lawson would report to Mr. Robert Page, or Mr. Louis Cates, or his predecessor, who reported to whoever was in New York. New York was the final say, and New York made a lot of decisions. They kept the purse strings. Any approval of expenditure of money was done from New York on the recommendations of the West. But the operating function was handled entirely by the West. The general manager, we called him in those days, he had a general manager and vice president title--Phelps Dodge had a very small organization. In 1950, they had I guess three vice presidents in New York: Mr. Drysdale, Mr. Dodge--

- Swent: Who was the family member.
- Fenzi: Yes. And Mr. Jess Hawkins, who was the controller, and Mr. George Drysdale, who was the financial man, and John Masten, corporate secretary. They were the only ones in New York, and then Mr. Lavender in the West as general manager and a vice president.
- Swent: And he was a man with mining experience, wasn't he?
- Fenzi: Yes. The other side of the group was the manufacturing and the refining. The president of refining in New York was Mr. Bennett, and the manufacturing president in New York, Mr. Brown, who was in charge of manufacturing. All of them reported to Mr. Cates or Mr. Page depending on--that's the way it was organized. Today, it's pretty much organized the same way. They have two or three groups which report to the chief executive. Anyway, that was the story in that time.
- Swent: When you moved to Douglas, was this a big change for you?
- Fenzi: I liked it. It was a nice change. We liked Morenci; my children enjoyed Douglas.
- Swent: Your children were all born when you lived in Morenci?
- Fenzi: Yes.
- Swent: Were they born there in Morenci?
- Fenzi: All but one. Just happened to be born in Pasadena. We enjoyed moving--Douglas was a little more--other than a company town. There were other people that lived in Douglas than the company. We met other groups.
- Then two years later, we went to New York, which was quite a change.
- Swent: That would be a big change.
- Fenzi: Particularly for the children. Well, for all of us.

The Dodge Family Influence

- Swent: Before we do that, let's be sure that we're--. You had spoken about the influence of the Dodge family. Would you like to go into that a little bit?

- Fenzi: I think it permeated the philosophy of the company. In other words, hospitals were always built in these Phelps Dodge towns. They had them in all of them. In two of the towns, they had a YMCA, because Mr. Dodge had been active in the YMCA and he thought it was very good. So we had a YMCA in Douglas--more than that--a YMCA in Douglas, there was a YMCA in Bisbee, one in Morenci--not in Ajo, because in the twenties, we didn't own Ajo. It was run by the C&A, which is a separate company, different directors. And a school, recruit teachers for schools.
- Swent: Was this different in Phelps Dodge towns than say, Inspiration, or Kennecott, or Anaconda company towns?
- Fenzi: The Dodges themselves, both Mr. and Mrs., would come out to visit.
- Swent: This is Cleveland Dodge who was still an officer of the company?
- Fenzi: Yes. So they went back and they always came out every year, spent time in every community, met the people, as the younger people were coming along whenever the--and visit the town, wander around. It just had an effect on the people in the community, a positive effect. No question it had a big influence over the years.
- Swent: Did you notice a difference when you came back after the war?
- Fenzi: No, it was still very much the same.
- Swent: Still that same influence?
- Fenzi: I don't think that changed. Mr. Dodge stayed on our board until '66, and still went out to visit the communities until he died in '81. I'm sure it was effective. Phelps Dodge also had very much of a work ethic. You worked long hours, and you thought you should; you did, didn't think much about it. You thought that things ought to be handled properly. They were a little more aggressive with bargaining with the union about details on a contract about rights to discipline for certain things, like coming to work. Some of our competitors were not quite so strong on that kind of thing.

Phelps Dodge's Policy of Employee Continuity

Swent: I think Phelps Dodge did a great deal of internal promoting rather than hiring people away from other companies.

Fenzi: That's right. A good many, mostly internal promotions, without very many exceptions. Most of our people came from-- or else they went to work for us someplace in between a few times in the lower echelon jobs.

We also had a program starting of going to the mining schools, and hiring summer students from mining schools to work in the mines at the different properties. Each property would make their own arrangement, but I remember visiting Minnesota and Missouri and recruiting at the Colorado School of Mines, and recruiting summer employment from the juniors of the mining schools.

Swent: You actually went out and visited to recruit?

Fenzi: Yes, at the location. Some of our people today who are running operations came from those. They went for a summer, and then some of them came back to work afterwards. A lot of them that we hired were ones that had worked summers. We also had a program when the times were good and when the copper price was good and we were working pretty busy, we would hire the daughters and sons in college of our employees, for summer work. Some of them had to work on the track, but there were a lot of things like that kind of job.

Swent: It was a job, anyway.

Fenzi: I think they all enjoyed it. They made a little money. They couldn't do it some years when the times were tough because we couldn't add any more labor, but most years they did it. So there was a continuity in our employees.

Phelps Dodge and Arizona State Politics

Swent: How much did you do, when you lived in Arizona, perhaps when you were in Douglas, in the way of relations with government at any level? Were you working with the Arizona legislature, or county or district government agencies?

- Fenzi: We were working with--the Arizona operations were very much involved with politics in the state. Sometimes successfully and sometimes not.
- Swent: How did you go about that, you personally?
- Fenzi: Personally, I didn't do very much of that. I would meet some people, some of the legislators would come out to visit and we would show them around.
- Swent: Did you ever initiate these visits? Did you invite them?
- Fenzi: I think they were invited by Douglas. When Mr. McFarland was governor of the state, he came to see us at times. And other people like that. The only thing I did--I was on the state apprenticeship committee, because we had a very active apprenticeship program at our mining properties.
- Swent: How did that work?
- Fenzi: It was a committee of the state legislature, I guess, or the governor, in which we tried to encourage apprenticeships throughout the state as a means of training people. We, of course, had a program and so did some of the other members of the committee that represented--they were mining and manufacturing primarily, and construction. In fact, the chairman was Bill Naumann of Sundt Construction, who had apprenticeships on their construction crews, and we would meet around the state trying to encourage other people to set up apprenticeship programs. That went on for about seven or eight years.
- Swent: Was this in parallel with union programs?
- Fenzi: They were. Our apprenticeship program was part of our union system; it was run under a joint committee with the various unions. Unions were in favor of it; training new machinists, new carpenters, new electricians, and so forth. It was with their approval, because craft unions always had apprenticeships.
- Swent: I was wondering why the state needed an apprenticeship committee.
- Fenzi: I think it was an attempt of the state at that time to encourage the training of more young people in good skills. At least that is all I can figure out. Anyway, they had one.
- Swent: Were you appointed by the governor to this committee?

Fenzi: Yes. It had some legislative backing, supported. Anyway, it was an important program because we trained more than we could use. A lot of them went to Phoenix and other places once they graduated as finished craftsmen. Our program always had a good reputation, quite in demand. I think it did some service to our people. In turn, we had trained people, properly trained for the skills. So I was quite in favor of apprenticeship programs.

Swent: Were you entertaining a lot of visiting firemen, visiting dignitaries?

Fenzi: No--well, they came to Morenci, that too, but not particularly Morenci, although they were normally--everybody knew we had a program--

Entertaining Visitors

Swent: I was thinking just apart from the apprenticeship program, just in general--

Fenzi: We had a lot of visitors from around the country--around the world.

Swent: Did you entertain them at home or did you have a club?

Fenzi: Both. We had a little guest house, and we would entertain them at our house or at the guest house.

Swent: Did you have a club sort of thing?

Fenzi: Not as such. We had the Morenci Club which was a building which housed the bowling alleys and the occasional dance, but it wasn't a club in the sense that it was a club.

Swent: Did it have eating facilities?

Fenzi: No. We had a hotel that had a restaurant.

Swent: Where did you take people out when they came? Or did you entertain them at your home?

Fenzi: If they were dignitaries, we would have them at the guest house.

Swent: And did they eat there as well?

Fenzi: They ate there.

Swent: I see, there was a cook?

Fenzi: And we had a housekeeper for that. If they weren't--we would entertain them with a dinner at the hotel or something. If it was a group--like the AIME came into town--

Swent: I was trying to get a little sense of Eleanor's involvement.

Fenzi: Yes, she was very active socially with all these people. We met a lot of people from around the world who came to Morenci.

Swent: When you were superintendent there, did you have to take--you were running the guest house and the club and those things as well as the mine?

Fenzi: The manager took care of a lot of things, too.

Swent: You jump from superintendent there and then went to Douglas. You skipped being general--

Fenzi: Going to Douglas was kind of a lateral promotion, I would say. I didn't have any on-hands operation responsibilities.

Swent: You didn't have to run the hospital or the school or those things?

Fenzi: When I was at Morenci, I did what Mr. Barker wanted done, but as a matter of fact, I was more involved in day-to-day operating decisions with the mines concentrator, and the smelter.

Swent: Did you get into the school and the hospital and those social things?

Fenzi: I was not involved in the schools very much. My predecessor, Mr. Lawson, was on the school board.

Swent: I see. But you yourself didn't have--

Fenzi: And Mr. Barker did not decide to be on the school board. We had people who worked for the company--it was a company town--that were on the school board.

Swent: I was just wondering whether you personally had to hire and fire teachers or--

Fenzi: I personally didn't get involved much in the schools.

- Swent: Did the company hire a doctor?
- Fenzi: Oh, yes, we had a full staff of doctors.
- Swent: How was this administered?
- Fenzi: We had a chief surgeon and administration in one man. A different job, but one man. Then we had enough doctors to take care of Morenci and Clifton, which were nearby communities where our people lived. We had a hospital which he managed and was the chief surgeon in most cases. We had about--varying amounts, but five or six doctors on our staff, and nurses on the staff. In my case, Mr. Barker did most of the overseeing of the hospital. It was a very active hospital. Subsequently they've changed back to a more passive position in that. Now they are farming out the hospital health plans.
- Swent: The old-time paternalism is out of favor now, isn't it?
- Fenzi: I guess you'd call it paternalism. I didn't think it was very paternal myself, but it's always--
- Swent: Well, company-controlled, let's say.
- Fenzi: Company-controlled, that's true. You could go elsewhere if you wished, but if you were living in Morenci it is not very handy to go somewhere else. Some people did; they went to nearby towns for medical treatment.
- Swent: But that would be more expensive, wouldn't it?
- Fenzi: Yes. The company took care of outsiders at their hospital, county people who wanted to come in the hospital, they came there to Morenci to the hospital, the county residents. They were what you call outpatients. That has changed. The whole health care plan has changed in the last twenty-five years.
- Swent: Yes, a great deal. You were in Arizona then until when?
- Fenzi: I was in Arizona until 1959. Then I was transferred to New York as assistant to Mr. Page, the president, moved from assistant to the general manager to assistant to the president.
- Swent: I have the impression that you were the first president who came up from the mining background. Is that correct?
- Fenzi: That's not true: Mr. Cates was a mining man. He had a long experience with Kennecott in the mines.

Swent: I see. But then he was succeeded by people who were lawyers. Mr. Page was a lawyer.

Fenzi: Yes. Mr. George Munroe was a lawyer.

Swent: And you succeeded Mr. Munroe?

Fenzi: Well, I didn't succeed him, I was made president, and I had the operating functions.

Swent: Is there a Phelps Dodge Company as well as a Phelps Dodge Corporation?

Fenzi: No, it is the Phelps Dodge Corporation, since I joined them. Prior--

Swent: No, I mean in your--

Fenzi: There was a partnership first, and then after that--no, it was the Phelps Dodge Corporation.

Swent: The western division was--

Fenzi: And the western division, they called it, mining division or whatever they called it.

Swent: That was headquartered in Douglas?

Fenzi: They had the headquarters of the mining division in Douglas. The refining division, and the manufacturing was in the New York office. They all had offices in New York.

Swent: Did each one have a president?

Fenzi: Refining had a president, manufacturing had a president, but the mining had just a general manager and vice president. The president of the mining was really the chief executive and he was also president of the corporation.

Swent: A little bit complicated.

Fenzi: I don't think Mr. Cates or Mr. Page ever used "President of the Mining Operation". They just would be president of the corporation. But there was no president of the mining operation, as there is now. We now have new titles, so the functions are similar but the titles changed.

Swent: When you moved from Douglas to New York--I guess we are ready to talk about that then?

Fenzi: Probably so.

Swent: How were you notified?

##

Mr. Walter C. Lawson, Vice President and General Manager,
Western Operation, As of 1958

Swent: We were talking about how you learned about your transfer to New York.

Fenzi: Mr. Lawson notified me that I was going to be transferred to New York.

Swent: By telephone, by mail, by--?

Fenzi: No, one on one.

Swent: Where?

Fenzi: I think it was in Morenci.

Swent: He came up to visit you?

Fenzi: Yes. Mr. Lawson was a very quiet man. He didn't talk when he didn't think it was necessary; very unusual in that respect. He could carry on a perfectly good conversation any time he wished to, but he didn't think small talk was necessary. He would be very much to the point, and then there would be a long period of silence. Then you would go on to discuss whatever he wanted. So between question and answer, he would think and he wouldn't talk.

Swent: How did you feel about this?

Fenzi: Oh, I met him so early in my career, I thought it was perfectly normal, and after a while, I was used to it. But it was a little startling for some people.

Swent: I can imagine.

Fenzi: Very nice man, very able man, great engineer.

Swent: Was he much older than you?

Fenzi: He was born in 1900; yes, he's fifteen years older. A very good friend, however; we became very good friends. He was always a very thoughtful person.

Swent: Did he live at Morenci at any time when you were there?

Fenzi: I went to work for him in Morenci. He was the chief engineer.

Swent: So he was living there at that time.

Fenzi: He was there until 1949, so he was there for twelve years.

Swent: So you knew him personally quite well, then.

Fenzi: Yes. A very able engineer, very good for Phelps Dodge.

VI ASSISTANT TO THE PRESIDENT, 1959 to 1962

"I Didn't Ask Many Questions"

Swent: So he came out and told you he wanted you to move to New York.

Fenzi: Well, no. He told me that Mr. Page wanted me to move to New York, or I had been selected to move to New York to assist Mr. Page. That's the way it was put. No description of what I would be doing particularly.

Swent: Oh, really?

Fenzi: I didn't ask many questions about it. Nowadays, they do it differently, I guess.

Swent: Very differently, I think, yes.

Fenzi: Ask a lot of questions.

Swent: How did you feel about it?

Fenzi: Well, I thought it was something different. I had no idea how--

Swent: Had you been to New York very much, to meetings?

Fenzi: No. I visited New York once in 1941 with my wife to attend her sister's graduation at Wellesley College with her mother. I guess that was the only time I had been in New York. We stopped in New York on the way home, which wasn't much of a visit. We were in New York I think two or three days, went to the theater.

Swent: Had you been there yet on the--

Fenzi: I visited when I went back for Southern Peru. That was the next time I was in New York, briefly.

Swent: That was just a business meeting.

Fenzi: We came in and left, stayed at the hotel, had the meeting and went home.

Swent: Which hotel did you stay at?

Fenzi: We stayed at the Waldorf.

Swent: Where was the P-D office?

Fenzi: At that time, it was down at 40 Wall Street, down at the Stock Exchange. Asarco was down there, too. They moved up just a year later across the street from the Waldorf, where they were for all the time I was in New York. Quite convenient place to be in New York.

Eleanor Fenzi and Five Children

Swent: Yes. So you went home with this news to Eleanor?

Fenzi: Yes, told Eleanor. She seemed to be thinking--I think we were kind of stimulated by it, interested.

Swent: Good. How old were your children at that time?

Fenzi: Let's see. My youngest, twins, were ten.

Swent: You haven't mentioned the children, let's get their names. The twins were--?

Fenzi: At the time we moved to New York in '59, the twins were ten.

Swent: And what are their names?

Fenzi: Joan and David; they're the youngest. My middle son was then twelve.

Swent: What's his name?

Fenzi: Warren S.

Swent: Warren S., you said?

Fenzi: Yes, named after his mother's side of the family, Shapleigh, Warren Shapleigh.

Swent: That's three; two more.

Fenzi: And then Louise was sixteen, and Charles, our oldest, was eighteen. He wasn't really eighteen yet; just about eighteen. He was a senior.

Swent: That is a busy household.

Fenzi: It was busy. I think it was difficult for--not for Charles so much.

Swent: He had just finished high school?

Fenzi: No, he was finishing. He had one more year of high school. He is a fairly gregarious person. Although he enjoyed Douglas, I think it was kind of an adventure to go New York for him, seventeen going on eighteen. He was there for one year and came right on back to the University of Arizona for college.

Louise was a sophomore. It was a little more traumatic for her. But she went to a private school there in Rye, seemed to--

Swent: Rye Country Day?

Fenzi: That's the one. She seemed to enjoy that.

Then my middle son also went to Rye Country Day for a year. I think he and the twins--well, the way they taught and the way they were supposed to perform back there were a little foreign to them, a lot more competition, even though the twins went to a public school. It took particularly my son David a little longer, I think, to get adjusted to it. But really, it worked out very well for them, and after a year or so, I think they enjoyed it thoroughly.

House-hunting in Rye, New York

Swent: How did you happen to choose Rye as a place to live?

Fenzi: Mr. John Masten, who was the secretary of the company, vice president and secretary--he was another vice president, that's who I was trying to think of--he lived in Rye. We had known him because he came west many times to visit. Mr. Dodge, again, took us under his wing. My wife went back with the children to look for housing and stayed at Mr. and Mrs.

Dodge's house, and they lent them a car. They went out looking for places.

Swent: Where did the Dodges live?

Fenzi: They lived in New York City, up on the Hudson River, what's that area--?

Swent: Bronxville?

Fenzi: No, in the city. It's just in the city, just across the river from Columbia University.

Swent: Riverdale?

Fenzi: Yes, Riverdale. They had a house overlooking the river there. We had gotten books, of course, giving some detail of all these communities. My wife spent about two weeks there with the two older children. We were also going to go to Europe. We had planned that earlier. I came back and joined them when we flew to Europe. That was in June. They looked at many places. Jack Masten found them a rental house in Rye, which we wanted to do first--rent a house, and then stay long enough to look around and decide where we wanted to buy a house. That is what we did. Eleanor found a house in Rye. We thought that was a good headquarters to look. We wanted to stay up north of the city, as long as the offices were uptown, where you didn't have a problem commuting. So that's how it worked out. It took almost ten more months to find the house we wanted.

A 90-Day Course in Advanced Management at Harvard Business School

Swent: And you took a little vacation in Europe?

Fenzi: Well, I was being transferred later that summer, so I did take this European trip in June, came back to Douglas. And then they decided to send me to Harvard Business School of Advanced Management for the ninety-day program. I reported back to New York for that, not really going to the office at all, just going up to Harvard. I reported to the office after I got through. Mr. Lawson had gone to the same program back in '52. He thought it was a good idea for me to take it, and so did Mr. Page, so I did that. It was a good way to make a transition, spend ninety days at the college.

Swent: What did you get from it?

Fenzi: It was a pretty good program. It had varied topics, from labor relations, to financial, to political, social, and really up to date on at least the concepts of business management--business theory of management, probably a better word--at that time. And I think you had as much benefit from the people that you met that were taking the same program with you as you did from the classes, but both were very stimulating.

Swent: Did you make friendships there?

Fenzi: Yes, some, very close friends with some.

Swent: Who?

Fenzi: One was a man that just died recently. He was much younger than I; he was my roommate. He was with Arthur Young accounting firm in Philadelphia and later a senior partner.

Swent: What was his name?

Fenzi: Don Fennelly, very bright man. Then Alan Hamer, who was with ICI Chemical Company in Australia. We have kept up correspondence ever since. There were two or three others like that. I guess there were 100 in the class.

Swent: Oh, a large class. But in three months you could get well acquainted?

Fenzi: Yes, we got to know each other quite well. I may be overstating the number as 100; maybe it was closer to seventy.

Swent: I have heard awfully good things of that program.

Fenzi: Well, it was certainly a good time in the transition, because I didn't have to have any responsibility at the office. You could just spend all your time getting up to date on what other people thought in the business community.

Swent: How old were you at that time?

Fenzi: I was forty-five.

Swent: Good age.

Fenzi: Yes, it was a good time to do it. It's designed for middle management. When I came in December down to the New York office, I started officially on the first of January, but

actually in the office in December, 1959. Mr. Cates died that year, in the fall, and I came down for his funeral. I had gotten to know Mr. Cates fairly well on his visits out West. In fact, he entertained us in France when we went over on our trip, briefly, took us to lunch.

Swent: Where? In Paris?

Fenzi: In Paris, where he was staying. He loved Paris.

Swent: Were your children with you on this trip?

Fenzi: The two oldest were.

Swent: What did you do with the three younger ones?

Fenzi: We farmed them out to others in our families. Then we took the three younger to Europe in '68, left the older ones home.

Swent: That's a lovely thing to do for them.

Fenzi: It was fun for us, of course. Anyway, 1959 was a transition year for us.

President Robert G. Page

Fenzi: But getting to New York, one of my duties was to keep up on the statistics of mining, milling and smelting, be an information and opinion source for Mr. Page. He wanted to ask any question about what was going on, even though he talked to Mr. Lawson on an operating basis all time, but he wanted some detail on what was going on in the mines. And anything else he had, that was our "gopher" position, whatever he wanted done.

Swent: You were assistant to him, was that your official title?

Fenzi: Assistant to the president, yes. Mr. Munroe had come into the New York office as assistant to Mr. Page in '58, so he and I had the same title. Again, we would do whatever he thought our talents dictated, for his benefit. He was a very delightful man, Mr. Page, very brilliant, very straightforward person, and a very gracious person.

Swent: In the old Phelps Dodge tradition.

Fenzi: Well, I would say, yes. He was one of those who bowed to ladies. He was a very brilliant man. He was a lawyer. His

background when he came with Phelps Dodge--he was born in the Middle West. His father was a well respected law professor out there at the University of Wisconsin, at Madison. He went to Harvard Law School, top of his class, but he went to Yale as an undergraduate. Then he went down to--what do you call that position with Judge Brandeis and the Supreme Court?

Swent: Clerk?

Fenzi: Clerk. Then he came back to New York and worked for the Security Exchange Commission.

Swent: Well, one of the names was Page. He was a partner in it eventually.

Fenzi: Well, he started the firm--well, he didn't start it. Mr. Whitney Debevoise and William Stevenson started the firm, but Mr. Page was one of their early partners, too, and one other man at that time, before the Depression in 1931. Mr. Whitney Debevoise had been a successful lawyer in New York. His talents were well known in the business area, so the firm was pretty successful from the beginning. Mr. Page--they used to do the legal work for Phelps Dodge shortly after joining this firm. I think Mr. Debevoise did some work for them before the firm was formed. After the firm was formed, Mr. Page was the partner who did most of the work with Phelps Dodge through the thirties and into the forties.

Then the firm seemed too--I think three of the partners went to Washington during the war. Mr. Page worked for James Forrestal [Secretary of the Navy, Secretary of Defense], and two of the others--I can't remember who they worked for. Mr. Debevoise was on some government boards for the war effort. How the firm survived during that period--there was nobody home--I don't know. They went back and forth, running their law practice, and were very active during that period.

Swent: When did you first meet Mr. Page?

Fenzi: I met Mr. Page when Mr. Cates brought him out as president in 1946 or '47, right after the war.

Swent: Brought him out to Arizona?

Fenzi: Yes, to introduce him. He was out there before that, but I didn't meet him. I think he was brought out the first time when I was in the navy. Mr. Page was very, as I say, brilliant. He came out after he was introduced, came out and stayed at each property for about a month.

Swent: Long time.

Fenzi: He educated himself on each property, with the people. You would get things for him that he wanted to study, or explain things he wanted to study. He had a very inquiring mind. He gave himself a correspondence course in mining, the details of mining, milling and smelting. He had worked on mining legal problems for quite a number of years, water problems, although we had a firm in Phoenix that did our water work for us. He had worked on problems for Phelps Dodge, particularly in New York. Anyway, he knew the company. He knew Mr. Cates, obviously. That's what he did. He was very interested.

Swent: So you didn't feel that he was someone far away.

Fenzi: Sat out at the mine, took a room, and then would ask for information and then go down to the smelter, down to the mill, stayed, asked the operators what was this and what was that. He learned a great deal in a short time.

Swent: And that would be very good for employee relations, I would think.

Fenzi: He was very quiet about it. He didn't make a big to-do about the fact that he was there, but people knew he was there, of course.

Swent: Shows a real interest in the properties.

Fenzi: Yes. So that was--and that's the man I went to work for. Then as I say, I was sent down to Peru just for the purpose of being representative for Phelps Dodge for Mr. Page.

Phelps Dodge Representative to Southern Peru Copper Corporation

Swent: Was that one of the first things you did there, then?

Fenzi: I don't know about first, but it was in the middle of 1960. I hadn't been there very long.

Swent: Fairly soon. Do you know Spanish?

Fenzi: No, I don't know Spanish, but I got so I could understand conversations because so much of it is in English words.

Swent: But you did not study Spanish?

- Fenzi: I did not study Spanish. Which I should have done many times but never did. I studied French, but it didn't do me any particular good. I went almost every year for the next twenty years to Peru to see what was going on up at the operations, and generally with the chief executive for Asarco. I didn't go down there by myself.
- Swent: Who were some of the--
- Fenzi: It would be different ones, but initially McKenzie, Ed Tittmann, and finally Charles Barber.

Attending the Inauguration at Toquepala, Peru

- Swent: You might recall the inauguration, that must have been--
- Fenzi: At the inauguration, Mr. Plato Malozemoff was there, almost everybody from Asarco was there, Strauss¹ and Brownell and so forth.
- Swent: Was this held in Toquepala, at the mine site?
- Fenzi: There was a series of things. There was a series of entertainment in Lima, local dignitaries. Then the actual dedication at Toquepala.
- Swent: Where were these entertainments held?
- Fenzi: I guess two of the clubs there in Lima were used, and the Bolivar Hotel, there was something there. There was a club right next to the Bolivar. What is it? A new one.
- Swent: Was it a mining club?
- Fenzi: No. It is an important club in Peruvian society. You walk right next door, almost next door, they used that. Then we all went down, flew in different planes down to the mine.
- Swent: Was there a landing strip there at Toquepala?
- Fenzi: No. The dedication was held in Ilo at the smelter, where there is a big landing strip, military landing strip. Then some of them drove up to Toquepala from there, which is about a two-hour drive up the mountain.

¹Simon D. Strauss, *Market Analyst for Non-Ferrous Metals and Non-Metallic Minerals, Journalist, Mining Corporation Executive, 1927-1994*, Regional Oral History Office, University of California, Berkeley, 1995.

- Swent: I've been to Toquepala once, but I didn't remember any way to fly in there.
- Fenzi: They had a special designed courier aircraft. Air Courier it was called, which was bought by the company that ferried people in and out of Toquepala. They had a field that was about a football field in length. You would take off down this grade and off--it was designed almost like--a very rapid rising plane. It's small; it only would take three or four people. But most of the time you landed in Ilo and drove up.
- Swent: So there were parties at Ilo and parties at Toquepala?
- Fenzi: A lot of the big things were outdoors, because all of the people in the operations and anybody else in the town and that kind of--speeches. It was quite an event for Peru because it was one of the big developments in Peru. It was well attended.
- Swent: Must have been exciting for you.
- Fenzi: It was very interesting for me. I had never been there. Of course, Peru was quite a shock for me, even from Arizona, as far as the desert is concerned. That was very interesting. Eleanor didn't go with me this time; I was the only one from New York from Phelps Dodge. Then I would go back--not every year. The first few years--maybe it was two or three years before I went back again. But I would go back, and go down to wherever it was. Mr. Ed Tittmann, I would travel with him a good many times, later with Mr. Charles Barber, because he was president for the rest of the 1970s--I guess Mr. Tittmann became president in the mid-sixties.
- Swent: He was president of Southern Peru Copper Corporation?
- Fenzi: Yes, and I worked with him. But he was down there for a while and also in New York. Then he became president of Asarco, you know.

Designing the Cuaione Operation

- Fenzi: Then we had to start to design the Cuaione operation. That was done mostly at Peru, at the office in Toquepala. I would go down and look at their maps on a regular basis. We also sent their mine plans out to our engineers in Arizona. But there again, we were responsible for a very large stripping expense for the Cuaione operation, which was accepted by

Asarco; [there were] some comments from the other two partners that there was too much stripping, although they concurred in the final decision.

[The Cuajone ore body was under two hillsides--north and south--and I recommended both hillsides be stripped completely open for mining, which added to pre-mine stripping. It was fortunate it was done at Cuajone after it opened, since it never had to increase its stripping ratio to catch up, and has operated efficiently from 1972 to the present.]¹

Swent: Too much stripping, they thought? I had the impression that you were criticized for being too conservative in your--

Fenzi: On the stripping side.

Swent: Maybe that is--

Fenzi: I think Phelps Dodge always tended to be very conservative estimating future copper prices, for one thing, even though they turned out better than we thought, mostly. We were conservative in that sense. And we were conservative about how much stripping you ought to do for developing a new mine. We felt it's conservative to spend a lot more money on stripping, before the start of production, than some of our competitors.

Deciding How Quickly to Deplete a Mine

Swent: I may be wrong, and I wish I could remember where I read this or heard it. I read it somewhere that you were criticized--I don't mean you personally as much as, I guess, Phelps Dodge, although maybe--for not mining rapidly enough, I think. That you kept the grade low or--

Fenzi: Well, I don't really know, and this part is kind of off the record, because I really don't know much about what you might be saying but--

Swent: I don't recall in detail either but--

Fenzi: We were conservative in one respect: we thought there was a length of time a mine ought to run, and you shouldn't deplete

¹Bracketed material was added by Mr. Fenzi during the editing process.

it too fast. I don't know whether that is the comment you heard somewhere or not. Our theory is that you can go in and mine it out and move on, sort of attitude. It is a hard--

Swent: And of course, all this ties in also with your prediction on the prices, doesn't it?

Fenzi: Yes. At least personally, I have always felt that you shouldn't--depending on the reserve, there is a rate at which it should be exploited which should be at least, if it is big enough to justify a big investment, at least run for over twenty years, at minimum.

The Limited Applicability of Cash Flow Analysis for a Mine

Swent: Twenty years after your investment is recouped?

Fenzi: At least something like that. Otherwise, you can spend a lot more on the initial investment and exploit the operation much quicker. Theoretically, you get your money back earlier, and therefore, theoretically financially more beneficial. But then you don't have any operating property after, so you have to start over again. My theory is that you should not spend a lot of extra money building up the capacity and then running it out shortly and then come back and spend a lot more money on the next one, whereas spend less here and run longer. The problem--the economic analysis problem which I've heard about at Harvard when I went up there, so-called discounted cash flow analysis of an operation, applies quite well to a manufacturing operation. But a mining operation where you have a depleting asset, it's not so applicable.

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Fenzi: The reason being that mining is such an expensive operation--initial investment and time--Morenci took five years to go into production. Toquepala took four years to go into production, since the start of spending the first money, and a lot more than that getting it ready to plan it and develop it. Tyrone we did work in the fifties but not much expense, and it went into operation more quickly, it took three years. But Cuajone took another four years before the production. Those are particularly ones with big ore bodies.

The other example of a mine where the reverse was done was the Cyprus operation in Tucson, which, I guess, you are familiar with.

Swent: No, not really. Do you mean Pima?

Fenzi: Yes, Pima. Well, Cyprus was a partnership with Union Oil who found the deposit, Cyprus Mines and Utah Construction, who did the construction. I think it was a three-way. It is a relatively small deposit compared to Morenci or Cuajone or Toquepala. They first put in a mill able to produce about 20,000 tons a day, which would have depleted the ore body in about twenty years. Then they added another expansion to the mill, so they really were depleting it in about ten years. They got their money back fairly quickly, but they spent a lot more money for the amount that was returned to them than you would if you had not increased the mill capacity, putting the extra capital in, which would return to them quicker but less than the total in that twenty-year period. Now, if you start putting a value on that in dollars, it is a very interesting economic exercise, because who is going to tell you what the dollar is worth for each of these twenty years? Or the price of copper! I question whether the bigger investment of capital was justified.

Swent: There is a trade-off that you have to make there.

Fenzi: And they can argue, a person that's in a hurry, can argue that it is worth doing, but it is not a good argument for a depleting reserve, I think.

Swent: Of course, it depends on what your prices are going to be out ten years from now also, doesn't it?

Fenzi: Well, you can take looking back, which is not a terribly good guide--

Swent: No.

Fenzi: But you look back, if you take Morenci, which came in really at the beginning of the war, because it was all built at the same time--it is producing something like--it's a 50,000-ton ore operation, which produced around 400 million pounds a year. If they doubled it at that time, which would have been difficult because of water, but let's say we had the water, double the capacity, which we ultimately did. Now it runs over 100,000 tons a day. We could justify it because we had enough reserve for it still to last twenty-five to thirty years down the road.

But if it had been a thing like Tyrone, where it was a fixed reserve, pretty much, known at the time you started, doubling the capacity from what it started out to be in Tyrone, which was the 35,000- or 40,000-ton operation, you

would have just spent a lot of money which came back early, but what was the price of copper? In the 1970s when Tyrone operated, the price of copper was reasonably beneficial to the operation, profits were better than we expected when we started the operation, the prices were higher, costs were higher and the prices were higher than the costs for the first ten years.

The next ten years, we had very little capital investment, but we had a very poor price for copper for three years and then a very good price for the last five of that ten years, up until they finally shut down for lack of ore for the mill. I think that worked out pretty well. But if we had doubled the capacity in 1972 and run out of the ore body in 1982, we would have spent a lot of extra money on the plant. We got our money back in 1970, but what we would have done in 1980, I don't know. We wouldn't have any money coming in. We would have had to refinance another ore body which we might have had, but with the inflation that took place in the seventies it would have been much more expensive. So it's an interesting--.

Swent: Do you ever put in the human factor in there?

Fenzi: Yes, sure.

Swent: You are employing people for twenty years rather than ten.

Fenzi: It's very much a factor. You don't retain people unless you have something fairly permanent. You don't have the benefit of people growing up in Douglas, continuing in Douglas, trained people, if you cut it off after--hire them and then cut it off. There is no question that people are a great asset. I've talked about it enough, that people are the reason it works. Our group of people have been very helpful in spite of some these things with strikes, they have been very helpful in making it more efficient. It is surprising how many ideas that the people on the job come up with, just small suggestions or small improvements, but the combination is amazing.

Swent: But they are more apt to do this if they feel a long-term interest.

Fenzi: Yes, if they feel reasonably comfortable. They get pride in the fact they work for Phelps Dodge. They may get mad at them once in a while, but it's the pride that they work there and the pride in their work.

Swent: And this takes time to build up.

Fenzi: I think it does, but it does build up. It is a very important factor, and that is one thing that Phelps Dodge has, is a very loyal group of people.

Swent: You have generations of people.

Fenzi: Yes. The head of Morenci right now, his grandfather came to Ajo from overseas, I think. Anyway, he is a grandson.

Swent: What is his name?

Fenzi: His name is Timothy Snider. But he's just one of many people with that background. Like you're from a mining background. But the individual employees are very central to it, not just the management. I used to know all the names of the miners in the Morenci pit. We had about 1,600 employees. I don't any more, but--

Swent: But when you were there--

Fenzi: I knew most of them, and they knew me.

Swent: It does make a difference, I think.

Fenzi: On the other hand, we weren't soft on our requirements for people to perform. We expected them to perform and work. I even saw that in the military, the difference between outfits, between those that had a little bit of discipline, I sometimes thought too much, had a much higher morale than those that didn't. I think that's part of--you have to be--. What's reasonable to demand should be demanded. It's worked very well for Phelps Dodge starting way back.

I met some of the old-timers, because they retired in Santa Barbara. I guess it was a pretty hard-headed bunch, but they seemed to get a lot of loyalty from their people, a lot of support.

Phelps Dodge's Excellent Cash Position in the 1960s

Swent: There was a time when Phelps Dodge had so much money--I guess it was in the sixties.

Fenzi: When I went to New York--in the sixties we had surplus cash in the bank and no debt. We were beginning to take on debt initially with the smelter for Hidalgo and the Tyrone mine development. That was late sixties we started to develop

those facilities, and they went into operation in the early seventies.

Swent: Were you involved with that at all?

Fenzi: Yes. I mean, from New York. The Western general manager was primarily involved, but I was involved--

The Flash Smelter Adaptation at Tyrone

Swent: That was the flash smelter, wasn't it?

Fenzi: That was an adaptation of the flash smelter--Outokumpu type--that had been developed in Finland.

Swent: Outokumpu?

Fenzi: Yes, I can't pronounce it properly, but that's the one.

Swent: That was pretty exciting.

Fenzi: It was exciting. It was a very expensive smelter. We built the Ajo smelter in 1950 for \$8 million, and we built the Hidalgo smelter in 1970 for \$230 million. Of course, there was inflation between those two periods, but it was an entirely--much more complex process, much more complex structure.

Swent: Of course, all of the environmental stuff had come in there too; 1970 was the--

Fenzi: Yes, it started around that period, '68 and '69.

Swent: The Clean Air Act was 1970, I think.

Fenzi: Yes, that's right. But that wasn't--we had designed it--we had picked the smelter before that. We had the inkling that we were going to have to get a smelter that would operate with much less emission.

Turning Down an Offer to Merge with Arco

Swent: Were you affected at all by the Atlantic Richfield--?

Fenzi: I remember talking to Mr. Anderson and the then-president--Mr. Bradshaw. Anderson was chairman--they came to talk to Mr. Page. It was a very simple meeting. They just made an inquiry if we would be interested.

Swent: Were you there?

Fenzi: We were there at some of the meetings, Mr. Bradshaw and Mr. Anderson, and Mr. Page, Mr. Munroe--

Swent: Do you want to tell about a meeting that you were--

Fenzi: We were there together.

Swent: How did it go?

Fenzi: We said we weren't interested, basically.

Swent: You said this?

Fenzi: No, I didn't, but Mr. Page did.

Swent: What was their offer?

Fenzi: They wanted to merge us into Atlantic Richfield. They subsequently turned to Anaconda and made an arrangement with Anaconda and merged Anaconda into Atlantic Richfield, I think within the next year or so.

Swent: How did you feel about this?

Fenzi: I wasn't interested in Phelps Dodge selling or anything. Oil drilling is quite different than mining, you know. As it turned out, Atlantic Richfield found out, and so did Anaconda, but Anaconda had then, of course, virtually disappeared. Of course, Kennecott was acquired very shortly after by the BP people.

Swent: Phelps Dodge is one of the ones that stayed.

Fenzi: Asarco had a more difficult time trying to keep out of a merger with Pennzoil, but was successful.

Swent: I was just wondering what your personal view of this had been.

Fenzi: Personally, I don't think hard-rock mining would mix with the oil business very well. I suppose personally I might have financially benefitted, I don't know.

Swent: Were you consulted at all? Did you have anything to do with the decision?

Fenzi: I don't think it got down to anything, except they approached us and asked if we would be interested, and we said politely we would not be interested. So that was it. There wasn't much study. They brought a few things about the finding of the North Slope, which was interesting to us, academically. But then we couldn't see anything, synergism particularly, that was common between oil production and mining.

Swent: Were you asked to make any sort of judgment on this, you personally?

Fenzi: I don't remember. I think probably I was asked, but--it wasn't my decision, but I certainly concurred in it.

Swent: Certainly hindsight shows it was a wise decision, I guess.

Fenzi: Yes. It's hard. We had had two associations with oil exploration; one I didn't know anything about particularly, except I knew it happened, was in the Korean War period. We had an oil venture with the partners.

Swent: Was that with Continental and--?

Fenzi: Yes, Continental and Cyprus.

Swent: And Carter.

Fenzi: Carter. We had a man who went out looking for oil properties for us, and we invested some money. We would hear the reports from New York. When I first went back East in 1960, we were still doing that activity. We'd get regular reports from our so-called oil man--well, not our so-called oil man; he was looking for properties for Phelps Dodge and the partnerships to buy. We drilled some wells and so forth. It was a very small operation. In the late sixties, we sold out our interest.

A Venture Into Aluminum

Swent: What about the aluminum?

Fenzi: That was one that we got into on purpose.

Swent: Were you involved at all in that?

Fenzi: Quite a bit.

Swent: Do you want to talk about that?

Fenzi: We made a decision that we ought to have aluminum metal in our manufacturing operations.

Swent: Who made that decision?

Fenzi: I guess Mr. Page. This started before--well, I was still assistant to Mr. Page and about the time I became vice president. We purposely went out and talked to people. The manufacturing operation thought that we should have a source of aluminum for their wire and cable. In hindsight, that was not a very good reason for getting aluminum. We bought our aluminum from Alcoa and other aluminum companies. It was perfectly good, straightforward business.

But anyway, we got the idea that we ought to invest in aluminum. So we got an aluminum consultant to advise us a little about the business. In turn, we were introduced to Billiton (Dutch), who had a bauxite mine in Surinam, and Alusuisse (Swiss) who had an aluminum operation in the States. We talked to them. I visited Surinam (Dutch) and also visited their Swiss operations in the States. This was Alusuisse. We finally negotiated--

Swent: Excuse me, where was Alusuisse?

Fenzi: They were in Tennessee. They had an aluminum foil plant, makes the stuff that you put on cigarette packages, a very fine foil. At that time, they were going to build a smelter on the Tennessee River. So we negotiated with them and finally formed a partnership, that took a period of time.

Swent: Were you involved with that?

Fenzi: Yes, I was involved in the negotiations on that. We made a contract with the Dutch to mine the bauxite, and in turn a contract with Alcoa to convert the bauxite into alumina in Surinam, they had an alumina plant there, and then ship it up to New Johnsonville, Tennessee, to a reduction plant which was going--

Swent: Where in Tennessee?

Fenzi: New Johnsonville, which is a small town on the Tennessee River.

Swent: So you were working--

Fenzi: They came up by barge from New Orleans, the alumina. We became partners with the Dutch and partners with the Swiss.

Swent: Both of them.

Fenzi: The Dutch was more or less a contract which had escalation for inflation.

Swent: Did you negotiate that contract?

Fenzi: Yes, with the approval of Mr. Page, of course. We used lawyers, of course, who were writing contracts. We had this association for the next fifteen years. We also went out and bought a few fabricating companies, one of whom was where we acquired Mr. Robert Durham. He had a small fabricating operation in the central part of the country, down in Illinois. Robert Durham, who later became president and chief executive of Phelps Dodge. He was in aluminum fabrication, had an extrusion plant. So we had the alumina, and then we started making some aluminum products in these companies we had purchased, so we were in the aluminum business.

Swent: Not for very long, though, were you?

Fenzi: We were in the aluminum business until the end of 1980, and then we sold our interest back to the Swiss. At that time, we had recovered a little more than what we put in it. We had the experience, and learned a little about the aluminum business. We found out some things about long-term contracts with high inflation; it makes them almost unrealistic. But it worked out. We were fortunate not to lose any money in our aluminum venture.

Robert Durham, an Asset

Fenzi: But we did acquire an asset, Mr. Durham. He came to work for us then and worked on our aluminum end. He then had a serious operation for cancer, and he retired. He was quite young at the time, forty. He didn't have any recurrence of the cancer, so he came back to work for us about five years later, and went to work for us in our international division, manufacturing international. From there, he came into general management in the end of 1984, I believe. George Munroe made him president of Phelps Dodge. Three years later, he was made chief executive, when Mr. Munroe retired as chairman and CEO. He ran the company until he resigned in 1990. He is a very able man.

Swent: Was he the one they called Bull?

Fenzi: Bull, yes. Durham.

Swent: He's a director of Homestake, I believe.

Fenzi: Is he? Well, he's a very able man. He is very bright, very thorough, very hard-working. He's one of the best negotiators I have ever seen. Some people can negotiate but never get the thing signed up. But he knew how far to go and how far not to go. He was an excellent negotiator with people.

Swent: It is a good skill to have, isn't it?

Fenzi: Yes.

Swent: And the experience from the aluminum venture came in handy.

Fenzi: I think it was just the fact that he had the personal characteristics that was helpful and he was a good business man. He knew about the aluminum business, but he was good about business in general. He got us out of it. He negotiated with the Swiss to sell our share of the joint company to the Swiss. I am sure he was very helpful there. So we got that out of the aluminum business.

Swent: Do you want to talk about--well I don't know, it is a little after four. I guess maybe we had better leave Western Nuclear for tomorrow.

Fenzi: I think we ought to save Western Nuclear for later.

Swent: Let's start with that. This might be a good time to stop.

##

[Interview 2: June 28, 1995]

Relations with the Labor Unions, 1946-1959

Fenzi: I guess we should talk a little bit about labor that occurred over the years. As I mentioned earlier, the Mine, Mill, and Smelter Workers Union and the various craft unions were certified to represent the employees at Morenci in 1943. Subsequent to that, the contracts were written. By the time I returned from the navy in 1946, our contract relations with the union in that regard were pretty clear.

The first event I remember specifically was the strike during negotiations in 1951, in which the union went on strike after we refused to meet their latest demands at that time. Mr. Barker, the manager, was away at the time of the strike, on vacation. So I was in charge at Morenci, which was an interesting experience. The strikers had closed--although we had not indicated any desire to try to work, the strikers massed in great numbers at our gates. I met with the local county attorney to protect our people in regard to those, who although we were not operating, were coming to work, such as our office staff and some maintenance people. It was a short strike because Harry Truman, using the war powers left over from the Second World War, got an injunction after a week and the union went back to work, because of the Korean War.

Swent: There were others, the craft unions were--

Fenzi: In all this, I might mention that all these strikes were, it was a joint--everyone, the craft union as well as the Mine-Mill, although the Mine-Mill was usually the leader in the negotiations and the decider in most cases of strikes. Every three years, as our contracts were for three, we would have a threat of strike and in many cases have a brief strike in the subsequent years.

The next one I remember specifically was one in '59, which was going on at the time I moved East. It was settled after about two months of strike.

Swent: I would kind of like a picture of the housing situation there and how the strike would affect you in this respect. Were the staff people housed separately?

Fenzi: The general position of Phelps Dodge in these strikes was that we, at the time of the strike, would normally not attempt to operate. So we'd just wait out and negotiate with the unions during the period they were on strike. During that time, we even gave the employees some credit at our stores when the strikes were prolonged, because they were occasionally over two or three months, and they would remain in their company housing.

As you may remember, Phelps Dodge in Morenci built housing for their employees. So most employees were furnished housing and paid low rent. Some of the employees who would rather live in their own houses lived in Clifton or down the valley towards Duncan and Safford. But most of our employees lived in company housing. We had a rental department which took care of rentals and maintenance of the houses and so forth. Each time we had an expansion at Morenci, we added houses.

The Mine-Mill merged with the Steelworkers, or the Steelworkers merged the Mine-Mill into the union, at the end of the 1950s. Prior to that time, our dealings with the Mine-Mill were, at least on a local industry basis, the copper industry, they usually negotiated with all of the companies at the same time, although we did not ever have joint company negotiations as such with the union. Each one of us carried out our own individual negotiations and reach individual settlements.

Kennecott Plane Crash Leads to Steelworkers Union in Mining

Fenzi: Going back to the Steelworker element: in 1949 or '50, I believe '50, Kennecott had a disastrous plane accident in which three of their top executives were killed. Following that, their board went outside the industry and hired Mr. Charles Cox from the steel industry to be the CEO of Kennecott. Mr. Cox, not terribly familiar with the copper industry, made the decision to bring the Steelworkers union to replace the Mine-Mill union in Kennecott. The Steelworkers had an election and were certified to represent the majority of the employees at Kennecott, other than the craft union people. That occurred early in the 1950s.

At the end of the 1950s, the Steelworkers made an arrangement with the Mine-Mill to merge their union into the Steelworkers. Following that, of course, the Steelworkers represented our employees as well as others in the industry in all of the other companies who had heretofore not had the Steelworkers.

Once the Steelworkers entered the picture, our negotiations changed, because the Steelworkers would negotiate with the steel industry and then come out to--following that, which is usually in the early spring of the year--and then following that they would come out and negotiate with the copper industry, which had negotiations generally in June, as our three-year contracts expired July first. At that point, they would merely hand us a series of demands telling us what the steelworker industry had settled for, and that was what we would generally settle for in the copper industry. We demurred on many occasions, and had strikes as a result and were able to hold the line slightly, but generally ended up with a similar settlement the steel industry had had.

Swent: How do the copper industry concerns differ from the steel?

- Fenzi: Well, the copper industry was primarily mining, and steel is primarily manufacturing, although they had their mines, but they also had lots of ore from other parts of the world that fed the steel mills in the United States. Whereas the copper industry was doing their own mining, producing the ore at their own mines in the United States. They were subject to the commodity market forces much more directly than the steel industry was because of the nature of the sale of steel and copper.
- Swent: Copper was more volatile?
- Fenzi: Much more volatile, subject to the world commodity market, much more than steel was. There was not a commodity market in steel, as you realize, perhaps.

Problems with the Cost-of-Living Clause, 1970 to 1980

- Fenzi: Going back a little, in the early fifties, General Motors in the automotive settlements agreed to install a cost-of-living clause in their contracts with the Auto Workers. The steel industry unions adopted such a practice later in the 1950s. So when we started talking with the Steelworker representatives, one of the first things they wanted to have was a cost-of-living clause in their contracts.

To explain a little, usually at each session we would have a discussion on wage rate increases. We would settle for a fixed amount, usually over a three-year period, some were two-year or a three-year period, in increments. In the case of the Steelworker Union and the Auto Workers, they did the same thing, but in addition added in a cost of living which took place on a six-months basis.

- Swent: This was readjusted every six months?
- Fenzi: Yes. In any case, in the early sixties, this effort by the Steelworkers to include a cost of living clause in our contracts, which they were successful in doing in the late part of the 1960s. Phelps Dodge took a long strike in 1967 into '68. We were unsuccessful in forestalling the cost of living.
- Swent: Were you involved in those negotiations?
- Fenzi: I was not involved in the negotiations after I left Arizona except on a general policy basis at the New York level,

deciding what the New York position would be. The direct negotiations were handled in the West by the general manager's office.

Swent: Were the costs of living the same at Morenci as at Ajo, for instance?

Fenzi: To explain the cost of living in a little bit more in detail, the cost of living was related to a government statistical cost of living index published regularly by the Labor Department of the United States government. That was the reference for adjusting the wages. It was not a realistic cost of living actual basis for the mines in Arizona. Nevertheless, that was the standard, and it was a standard in other contracts, the Auto Workers, Steelworkers, and so forth. But there was a lot of criticism of the cost of living index by many economists, because it is not a true measure for any given area of the country, given other factors such as company housing, clothing needs, food, or whatever. I guess very recently, in the last year, 1995, there has been criticism over the cost of living index as it has been used by the government to change Social Security payments as being an inaccurate measure of actual changes. We had similar criticism of it back in the 1960s.

Swent: You felt that it really wasn't relative--

Fenzi: Well, other measures might have been more accurate, such as the discount index. That's kind of an aside to the whole matter, but that's what we were discussing back then, once we got into this argument about cost of living not being representative of the actual changes in living costs. Plus the fact that we were already giving wage increases each year to our labor which we thought answered the question of the cost of living, basically.

Swent: The '67-'68 strike was a very long one?

Fenzi: It ran from July first until, I think, the end of January of '68, maybe into February.

Swent: Was there ever any violence?

Fenzi: Because we did not attempt to work, except for minor incidents on the picket line where they would object to somebody going in and out of the plant, which--the first months of the strike--was a rather limited extent. We had no violence as such. In fact, I thought we were pretty generous by allowing the employees to have credit during that period, including the long strike in '68.

However, the cost of living pressures continued to build up. Unfortunately, in the 1970s, the cost-of-living index moved up very rapidly with the inflation of the 1970s. In fact, by the end of the 1970s, the cost-of-living factor added as much as 15 percent a year to our wage costs, at which point at the end of the 1970s, our wage rates were considerably higher than they were at the beginning of the 1970s. On the other hand, at the same time, the price of copper, the commodity for sale moved up relatively more slowly, so a real squeeze between costs and price had taken place during that decade.

The last strike I was involved in took place in 1980, the year that I retired. It was a two- or three-month strike, similar to those in the past. It had not been settled when I retired in September of 1980. I visited Morenci at that time. There was kind of a company picnic for me at Morenci where I had been for so many years, and all of the employees as well as everyone else came to the picnic, even though a lot of the employees were on strike at the time. It was a big event down at the Clifton Park, a retirement party. The strike situation was coming to a crucial point at that point in time.

Going back a little bit in time, in the 1960s, I don't remember the exact year; I think in 1965, the union negotiations reached completion with all unions except the railroad unions at Morenci. When they reached settlement with the craft unions and the Mine-Mill--I mean, now the Steelworkers--the railroad unions wanted another incremental raise in their rates over and above what they had been before, in relation to the other union's rates in our rate structure.

Friction Between the Railroad Union and Other Unions

Fenzi: I have to explain that a little bit. There were about thirteen levels of rates, starting with the bottom rate laborer and going up to the top rate, which was a shovel operator. The railroad union was in the area of the skilled labor rate, journeyman rate, carpenter, machinist, and so forth. They wanted a step up in rate and held out at that time. Phelps Dodge did in Morenci decide to operate the trains without a settlement from the railroad workers.

The result was that the other union members were not very sympathetic to the railroad workers' position, and they were perfectly willing to cross picket lines and work, and so we operated the trains with supervisory personnel and others.

The railroad union capitulated and finally settled with what had been offered the other unions. But that's the only incident I know during my period with the labor that we had a settlement which required an aggressive action of crossing picket lines and working--thus forcing a settlement.

Swent: So there was friction between the unions or among the unions as well?

Fenzi: I am sure that--they got together to negotiate, but they didn't always see eye to eye on what they should emphasize in negotiations. The trend on the part of Mine-Mill and the Steelworkers was to try to raise the bottom rate at the expense of the higher rates, so there was a gradual contraction of the difference between a skilled journeyman and a regular laborer during that overall period, also enhanced by the fact that many of our settlements were so much an hour, which also tended to contract the difference. From time to time, we would make some settlements in which we would extend the difference in the journeymen, but in general, between the 1940s and the 1970s, the percentage difference between a day laborer, just a laborer, and a journeyman was percentage-wise quite constricted.

When I went to work in 1937, the going rate of the day laborer was forty cents an hour. The journeyman was getting, I think, a dollar and a half an hour, approximately. In other words, six dollars a day, as against three-twenty a day, almost double. By the time I had retired, the difference had gone from--it had gotten up to where a laborer was getting around eleven or twelve dollars an hour, and a journeyman was getting eighteen to twenty. I guess he was getting eighteen.

Swent: Much less difference, then, proportionately.

Fenzi: So the ratio was quite different. Initially it was about two to one, and by the time I retired it was less than one-and-a-half to one.

A Wage Bonus Based on the Copper Price

Swent: You had mentioned earlier that there was also a bonus on the copper price.

Fenzi: When I went to work, the company paid a bonus in relation to a percentage of your salary or wages which related to the price of copper. As I recollect it, I am not exactly sure, but it

seemed to be at eleven cents a pound, it was zero; then you would add 5 percent for each one cent it was higher than that.

Swent: Then this later went out, did it?

Fenzi: Yes. Before the union organization, this was in effect for some time prior to the war. When they froze the wages during the war, that ended this idea, at least that type of bonus, as distinct from an underground bonus for production, which was not involved. That's a different sort of a bonus. So there was no copper bonus going on after the start of the war. During the war the unions had taken over, had gotten the contracts with Phelps Dodge, and didn't want a copper bonus. Although from time to time, Phelps Dodge suggested we go back to some sort of a bonus related to the price of copper, and particularly in negotiations in the 1970s, it was offered in lieu of cost-of-living. There was some interest on the part of some unions, but we never achieved that particular arrangement until 1983. It was finally put in effect in our "final" offer to the union, when we invited our employees back to work, against the wishes of unions which were on strike.

Swent: Would you have preferred that to the cost-of-living adjustments?

Fenzi: Very much so. Much more accurate because of our industry and the fluctuation of copper prices. In fact, ultimately, which is after I retired, they reached this sort of an arrangement, and today our people are paid a bonus if copper prices exceed certain categories. In relation to their pay--they receive at the end of the year a bonus related to that.

The Strike of 1983 and Decertification of the Unions

Swent: However, since you retired, the unions have been decertified, haven't they?

Fenzi: Yes, in the strike in 1983, we had a very major confrontation with the unions. It took place because of the squeeze of the cost of living, and the cost of labor, and the drop in the price of copper. When I retired, it was about a dollar a pound or a bit higher than that. When 1983 rolled around, it was seventy cents a pound, so that Phelps Dodge couldn't operate and have any kind of a profit, and that's when the 1983 negotiations took place. They again had the usual position of the Steelworkers, "We should pay what the steel industry pays." Although the steel industry was having difficulties,

too, they had given another raise in that year, early in January. So that's what faced Phelps Dodge management in June of 1983, who at that time had offered to--had made a strong offer to--

Swent: Were you still on the board at that time?

Fenzi: I just retired from the board in May.

When the offer was--the negotiations were--when it came to my knowledge, it was given to the board members. As I understood at the time, Phelps Dodge offered a wage based on a bonus on the pay related to the price of copper, starting at an eighty-cent price, as I remember, and paying no bonus below that. No cut, but the elimination of cost-of-living adjustment. And as history says, we had a confrontation and decided to try to operate the various locations, in spite of the union, which did lead to some violence at the various properties of Phelps Dodge, Ajo and Morenci, and Douglas.

[As mentioned earlier, during the labor negotiations in 1977 and 1980, Phelps Dodge made a strong effort to substitute a bonus based on copper price from the cost-of-living clauses in our labor contracts. Although some of the other mining companies shared our views, they didn't make any effort to bring it up in their individual negotiations. During the 1970s copper prices moved from fifty-four cents to ninety-three cents. At the time of the 1980 negotiation, it was one dollar and three cents, so it was difficult to argue that "cost of living" should be eliminated, although Phelps Dodge took a three-month strike trying.

By 1982, however, copper prices had dropped to seventy-three cents while labor rates had increased another fifteen percent per year. Phelps Dodge shut all their mines in April 1982 because of impending losses. They then decided to reopen Morenci in October--on the basis that there would be less cash loss running than shut-down, and followed by reopening Ajo in February 1983 and Tyrone in May 1983. So as Phelps Dodge entered labor negotiations in late spring of 1983, our people knew we were operating at a loss. Phelps Dodge decided to stand firm on their offer of June 31st which added a raise and a copper bonus clause--while eliminating the cost of living clause. It was the only company in the copper industry to take that position, and further, to "leave our gates open" and we invited all the employees to return to work on that final offer. This position, decided by George Munroe, had the full support of the board. It was a difficult and divisive period in our small mining communities of Morenci and Ajo and Douglas, but there were principle reasons. One: A firm and

dedicated local management organization--from the branch manager to the lowest foreman, including the office staff; and two: a great many of our employees believed us and knew we were in a loss situation and were willing to come to work in spite of strong pressure and threats from some of their union-convinced fellow workers.

The key to the firm and dedicated local supervisory staff was our general manager, Arthur Kinneberg, for he inspired dedication. Art came from Chile to work for Phelps Dodge at Morenci as smelter superintendent in 1958. He soon knew all his people individually and encouraged innovation. As he moved up the management ladder, this was felt throughout the western mining organization. He was made general manager in 1976. He had been in charge of two labor negotiations--1977 and 1980--before the important one in 1983. His presence at the various properties during the critical period of that strike helped sustain the local management.

The support of many of our employees, which even crossed family lines, had been built up over many years and was founded on the belief that Phelps Dodge had been honest and fair in the past and had made a fair offer in 1983--they didn't agree with Pittsburgh's adamant position and were willing to cross the picket lines, which took courage.}]¹

We were successful in operating the operations in spite of the union resistance and with the help of state police protection at Morenci. After a year of operation, there were elections held, and decertifications took place with our various union-represented groups voting for decertification. The details of that I am not familiar with particularly, as I had retired from the board in the spring of 1984. At this present time, I do know there is a bonus pay based on price of copper to our employees, and further that our employees pay--at one point was higher than others in the industry. Subsequently, I think some of the other companies have adopted similar plans with their unions, although most of those are still unionized.

¹Bracketed material was added by Mr. Fenzi during the editing process.

The Different Labor Situation at Tyrone, New Mexico

Fenzi: I will digress a moment somewhat from the topic, but still labor. Our Tyrone operations were also unionized with a slightly different group of unions.

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Fenzi: --where we had the electricians, the Steelworkers, Operating Engineers Unions representing our employees. They had elections which were called, when the union organized their operations there shortly after the operations started.

Swent: Of course, that's a different state as well.

Fenzi: It is also a different date. It was one year different than the ones in Arizona, one year later, if you want to put it that way.

Swent: So your cycle was different?

Fenzi: A slightly different cycle. That was the situation in Tyrone. That's why they were not involved in that 1983 strike in Arizona, but subsequently negotiations were held then the following year, and while they're still unionized, we had a wage rate which was somewhat similar to the one with the other companies, followed more the pattern of the Kennecott and Asarco. We had Tyrone operation on slightly different wage rates than we did in Arizona.

Swent: Phelps Dodge was not in step with Asarco and Kennecott?

Fenzi: Tyrone was still union.

Swent: This is after the decertification of the others?

Fenzi: Yes, just to point that out. The Hidalgo smelter, which started up when Tyrone started, was never union, never has been unionized. That is, I think, all that I have to say on the labor matter.

Swent: Were you ever approached by the Teamsters? Did they ever get into the picture?

Fenzi: They attempted to join, organize a portion, but the Mine-Mill covered the Teamsters pretty thoroughly. That was similar jobs, truck drivers, labor kind of things. So the Teamsters were in conflict with the Mine-Mill positions, and the Mine-

Mill had much stronger support than the Teamsters could generate within the working forces.

Swent: They weren't able to get in, then?

Fenzi: So they weren't able vis-a-vis the Mine-Mill to be successful. I think their efforts weren't very extended. The Mine-Mill followed more or less the industrial unions, such as CIO, which was sort of groups of people. It covered many more classifications than some of the ones specific to the craft unions. So we didn't have much of an effort by the Teamsters.

Swent: Was there ever any personal effect on your family when these negotiations or strikes came along?

Fenzi: During the time I was in Arizona, I don't believe there was any, as far as we were concerned. Back in the early period, way back in history, in the First World War, they ran all of the family members out of Morenci, as I heard from others. They had to live out in Duncan forty miles away because of the union feeling.

Swent: I just wondered whether you felt any personal unpleasantness.

Fenzi: It was always amazing to me how people that I knew every day on the job would get this hysteria and call a strike, support the union leaders who were, of course, from other parts of the country, and temporarily, at least, take a position that was all wrong, which happened every time we had negotiations to some degree. We noticed a rise in the number of grievances filed prior to a strike, a lot of rhetoric in the local negotiations when I was at Morenci, speeches and so forth, preliminary to getting down to negotiations. To that degree, I was always surprised at the change in attitude that took place.

The 1970s Oil Crisis and Rise in Costs; Serious Inflation, 1973-1981

Swent: We haven't mentioned this before, but '73, of course, was the oil crisis and OPEC [Organization of Petroleum Exporting Countries] and then CIPEC [Conseil Intergouvernemental des Pays Exportateurs de Cuivre; Intergovernmental Council of Copper Exporting Countries]. Did this have any effect?

- Fenzi: Right. This had a major effect on costs, because we used quite a lot of fuel. It affected us in fuel costs particularly.
- Swent: And then the CIPEC organization that tried to control the copper prices, was--?
- Fenzi: No, I don't think there was--.
- Swent: Of course, this was countries other than the United States, but I wondered whether you felt any effect from that?
- Fenzi: With respect to CIPEC, it was an organization, but it did not control the copper market. It was an organization which tried to promote the use of copper more than anything else. The effect of that economically was not material to the price of copper. What was material to the price of copper was the large expansion in production that took place in the seventies around the world, which resulted in a very large inventory at the end of the 1970s, and the resulting drop in prices for copper, even though copper consumption had gone up, too, during the whole decade. But the capacity and production of it had increased, a lot of it owned by governments rather than by individual companies, and the governments desired to run at full production regardless of the price. That affected the markets in the early eighties.
- Swent: I just wondered whether it affected you in any way.
- Fenzi: A group tried to corner the copper market one time in my knowledge, back in the 1890s. It worked for a little while but unsuccessfully finally. The Hunt brothers tried to corner the silver market for a time in the sixties, unsuccessfully. They had some short-term effect on prices. But in general, the copper price was related to supply and demand, plus the uncertainty of speculation by people not interested in copper but interested in speculation--commodity speculation.

That became more and more prevalent in the seventies, and in the eighties and the nineties now, which makes it much more volatile than it was back in the fifties when most of the trading in the commodity was hedging to protect your price on a sale; if you made a product at a price, you hedged it so you wouldn't have to pay a premium when you delivered the product. But in the latter part of--early in the seventies, commodity trading became quite a speculative thing and has remained so ever since.

The Clean Air Act and the High Costs of Compliance

Fenzi: Another major factor in the industry became the high cost of another problem after they passed the Clean Air Act in 1970. Although we had foreseen pressures in this area, particularly in regard to smoke emission control, building up in the late sixties, we realized that by 1970 we had a serious problem. Going back in time, part of the smelter smoke we had--the Morenci smelter was built with a reverberatory furnace and converter technology. They had no roaster step in its process. The effect of this was that the strength of the sulfur gas in our stack emission was much lower than it would be if we had had a roaster operation in the circuit. The reason for the difference was that we were treating concentrates rather than direct smelting ores by the time the smelter was built for Morenci, and we did not need a roaster step in the process.

Swent: The concentrates came from the flotation plants to the reverberatory furnace?

Fenzi: Yes. Which ran in the order of twenty percent to thirty percent grade of copper. We did have a roaster plant in the smelter at Douglas, because we were treating direct smelting ores from the Bisbee operation, and underground ores, which are direct smelting ores. A roasting step was needed to upgrade the ores before it was introduced into the reverberatory furnaces. This gas was quite a bit stronger. The range was maybe five times as strong. At Douglas we had two stacks, one for the roaster and one for the reverberatory furnaces and convertors.

In any case, at the time of the Clean Air Act, we were operating three smelters: one at Ajo, which was built in 1951 for the purpose of reducing the cost of freighting concentrates from Ajo to Douglas. It was built, as I said earlier, for \$8 million. It was a special design, Mr. Kuzell's design, very carefully related to the type of concentrate product at Ajo which were easy smelting concentrates, being principally chalcopyrite. So it was a relatively high capacity reverberatory furnace--one furnace--and was quite an efficient smelting operation.

The one at Morenci, which was built to handle the Morenci concentrates, which also had only concentrates, but those concentrates there were a combination of a good deal more pyrite and mostly chalcocite, as distinct from Ajo which had chalcopyrite and relatively little pyrite. So the sulfur

content emitted from the Ajo concentrates was considerably lower per ton of concentrate than it was at Morenci.

In any case, Morenci was a straight concentrate smelting operation, whereas Douglas continued to be able to smelt various types of ores and concentrates and scrap, etc.

The effect of the Clean Air Act on the copper industry has been material over the years since it was passed. The Clean Air Act first attacked the solid emission part of the smoke, which--just as a sideline, we had installed at Morenci Cottrell systems. We had them at Ajo, and we had them at Douglas, which removed a major portion of the dust particles coming off the reverberatory and converters. But there were still some particulates left in the smoke, mostly inert ones such as lime and rock particles.

The standards were set to remove some of these, which in most cases required a baghouse of some kind to do it. The principal electrostatic precipitators had an electrostatic field which the gases enter, and those that are metallic will react and adhere to electrodes within the flow stream, and then can be removed periodically by reversing the field, dropping the field and discharging the particles to a collecting unit. In the case of inert material, such as lime and rock and other kinds, it would require something sort of like a filter, which sits in the baghouse.

Swent: I think you were first required to remove 75 percent of the emissions, weren't you?

Fenzi: No, the requirement wasn't--

Swent: Or 75 percent of the sulfur, maybe?

Fenzi: No, that wasn't required. Initially, the requirements did not require us to reduce the SO_2 , but it did require us to remove the precipitates further.

Swent: Just in general.

Fenzi: Primarily focusing on that. Then they later focused more and more on the SO_2 emissions. So we realized that we were going to be faced with that, and that's why we designed the Hidalgo smelter, adopting a system which had been developed in Europe for the smelters which were installed in the urban areas of Europe, where they had been able to reduce the SO_2 emission by converting the SO_2 and SO_3 in an acid plant operation and removing a large percent of the SO_2 in the form of sulfuric acid. That is what we adopted at Hidalgo.

The Outokumpu Flash Smelter at Hidalgo

- Fenzi: There were several different types of smelting at that time, but this one had been proven in Germany and in Finland. So we decided to adopt that particular system, Outokumpu system, and built the type of plant that used it. Which essentially was to place in the reverberatory an enclosed vessel in which the smoke went through at a very large electrostatic precipitator prior to the acid plant, which was in series with the reverberatory. They called it a flash smelter, flash furnace. The flash meant that they used the sulfur in the concentrate for part of the energy to melt the concentrate, as distinct from using only natural gas or coal or some other fuel outside to melt the concentrate as is done in a conventional system. So we built the smelter at Hidalgo, which was also a long ways from any urban environment.
- Swent: Did you contract this out?
- Fenzi: All our major construction of buildings and plants were done by outside contractors.
- Swent: Did you have anything to do with the selection of the contractors?
- Fenzi: Oh, yes. We didn't contract that out; we always selected our own contractors.
- Swent: But you, I meant, you personally?
- Fenzi: Basically, yes, we approved. The general manager's office in Douglas, negotiated with the contractors and made the arrangements, the plans, approved the plans and so forth, and had a staff in Douglas which was the headquarters who supervised the contractor. There was an engineer in residence and so forth, which was the normal procedure for any plant construction. New York was only involved in the approval of the plans, approval of the money. Later, however, I did sit down with the contractor to discuss "overruns" that occurred and agreed on dollar limits to Phelps Dodge's obligation.
- Swent: When you were in Douglas or in Morenci, did you have any input into those decisions?
- Fenzi: I had input into any expansion at Morenci when I was there. The Tyrone and the Hidalgo smelter were both managed by the general manager's office.

- Swent: I just wondered if you had any part in the decision of the contractors.
- Fenzi: I was in the line of consulting on all of those decisions, but the final decision was, of course, made by the president of the company. The final recommendations were made by the general managers, Mr. Walter Lawson and his assistant John Gentz, who succeeded to general manager before the smelter was finished.
- Swent: How did you feel about those decisions?
- Fenzi: I was very much in accordance with the decisions made at the time.
- Swent: Did these changes in technology involve changes in training of the labor?
- Fenzi: Yes, it did. We sent some of our key people who were going to be the foremen, as well as some of our technical people, to Finland. Then in turn, the Finnish people came and helped us train our people as we started the operation. A very thorough--Mr. Leonard Judd was in primary charge of that smelter construction, and later operation. He spent a good deal of time in Finland and with his people. They drew up very careful instructions for the people that were going to operate. We had experienced men brought over from our other smelters to run the Hidalgo smelter, but they had to learn a few new tricks or new skills to operate the system, which carefully was researched and spelled out. We started out relatively without any particular trouble.

This was true also on the Tyrone operation. We transferred people from other operations, skilled people, transferred them over to Tyrone, both in the mine and later in the mill. We brought a mill superintendent from Ajo to operate the mill at Tyrone who had operated the one at Ajo for some years, which was a practice with Phelps Dodge, to bring in experienced men from one operation to another as we expanded. Which was a great asset. We had done the same thing for the Toquepala operation, furnishing skilled people.

Training Personnel at Toquepala

- Swent: From here?

Fenzi: 1960, prior to 1960. Although the Asarco people furnished the smelter personnel for the smelter at Ilo, and the concentrator personal were furnished from different sources around the companies involved, primarily Asarco and Phelps Dodge.

Swent: But the mine people--

Fenzi: Were primarily from Phelps Dodge.

Swent: Where did you get them from?

Fenzi: From our various operations in Arizona. Some we recruited who we knew about. We did the recruitment in Arizona. We recruited skilled people, had a designation of--I guess we called them trainers, as a shovel operator trainer, as a truck driver trainer, as a drill operator trainer, and so forth. That is what they did, they went down and started training Peruvians, most of them Indians off the high country, to do these various functions. I will say, they learned quite rapidly to do it. They became quite skillful.

They had one characteristic, they had difficulty with the truck drivers, because they had no knowledge of it, as they didn't with the other pieces of equipment, but in truck driving you have to look ahead to what somebody else, driver is doing. That was difficult for them to learn, anticipating a problem that might occur with somebody slowing down or turning or something else. Before, they got right to the problem. That was more difficult to instill in the Peruvian Indians' concept of operation. Whereas straightforward, like shovel operating or drilling, they learned much more quickly. They became very good labor.

Swent: Did you personally select the people who went down there?

Fenzi: No, I did not. Our people on the staff--some of our labor personnel department. I was involved in the selection of some of the foremen who went down.

Swent: And the superintendents or the manager down there?

Fenzi: Well, Mr. Lawson made that recommendation, took Mr. Warren Smith out of operating the Bisbee mine, selected him. Some of the men from Morenci I picked at the time. They started up in '55.

Swent: Had you known Mr. Tittmann?

Fenzi: No, I didn't know him until afterwards, after he became head of Southern Peru operations.

- Swent: Who of those people had you known?
- Fenzi: From Asarco?
- Swent: Of Southern Peru, the people who ended up at Southern Peru. Had you known them before?
- Fenzi: I had known Mr. Malozemoff, much earlier, but that's the only one of the ones at Asarco or Newmont or Cerro that I knew prior to the Southern Peru venture. I started to meet them in 1960--
- Swent: In New York?
- Fenzi: In New York, and at the dedication, and then my trips to Peru. Then being in New York, I got much more acquainted with people in New York that were representatives of the New York companies. Our office was in the same building with Newmont, which was involved. Cerro later had an office there, too, in the same building. So I knew the people after I got to New York only.
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- Swent: Would you like to talk at all about some of the differences among these different companies? Newmont and Cerro and Phelps Dodge and Asarco are all quite different companies. Could you discuss your relations with them or your perceptions of them?
- Fenzi: The mining industry in general was always known for exchanging ideas--technical ideas--with each other. This was done in various ways, at AIME meetings where technical papers were given in some detail and at length in the different parts of the mining business--smelting, refining, concentrating, and mining. At these AIME meetings, we would meet other people in the same industry as ourselves. We exchanged visits with each other's mines.

The New York Mining Club

- Swent: What about the Mining Club in New York?
- Fenzi: The Mining Club was started in New York by some people who were in the mining business in New York and they thought that they would like to start a club. It had been started well before I went to New York, which I joined. It was more or less a social club. Mostly you went with your own people in

your own company. However, you met there many people from other companies who used the club at the same time. So of course, as we had this same building as Newmont people, and some of the Cerro people, we met people from those companies regularly at the Mining Club, which was in the same building.

The downtown people didn't come up to the Mining Club very often, although they belonged. It was too long a trip for lunch. Only rarely did they come uptown--

Swent: Who were the downtown people?

Fenzi: Asarco, the people in Asarco primarily, and some in Anaconda, who both had their offices downtown. We would see them occasionally at a party of some kind that the Mining Club would put on. It was more of a social thing than anything else. Most of the exchange of ideas was in the AIME meetings or the Mining Congress meetings, which was a kind of an organization of companies rather than of individuals. Companies had individual members of their companies as members. They were primarily interested in the technology of the industry, but also in the national economics and factors of that type.

The American Mining Congress

Swent: What was your role in that?

Fenzi: I was just a member of the Mining Congress, as being an officer at Phelps Dodge.

Swent: Did you serve on any committees?

Fenzi: Occasionally on a committee, yes. On some of the technical committees in the Mining Congress, I served on those. Chairman from time to time, or a paper presented, starting back in the 1940s. While I was still in Arizona, I presented a paper to the Mining Congress.

Swent: What was the topic?

Fenzi: You shouldn't ask me that, I forget. [laughter] I think it was rail haulage, if I remember correctly, some techniques for rail haulage. But that type of thing I participated in that way, at the Western Mining conferences of the Mining Congress, with technical papers, technical discussions. Mr. Munroe was on the board. Mr. Page was on the board when I moved to New

York and Mr. Munroe succeeded him on the board of directors of the Mining Congress.

Swent: Did you go to Washington to visit legislators?

Fenzi: The Mining Congress held an annual business meeting, a one-day meeting, in Washington every year, usually in late January.

Swent: This is the Mining Congress?

Fenzi: Yes. At that time we used to go down and see some of our Arizona congressmen who were in Washington.

Swent: What did you talk to them about?

Lobbying in Washington and Arizona

Fenzi: About the mining industry and problems. Such things as tariffs and--. Of course, when the Clean Air Act was established by the EPA, problems relating to that, legislation relating to that. Basically lobbying. I registered as a lobbyist, because I did go to see my congressman, representing the company. I was a certified lobbyist, although I rarely went to Washington other than occasionally like a particular event which--

Swent: Who were the congressmen that you were talking to?

Fenzi: They varied of course, over time. Starting with Mr. Rhoades, congressman from Arizona; Mr. Mo Udall. I remember those two particularly; they were there quite a while representing Arizona.

Swent: What do you remember about them?

Fenzi: Mr. Mo Udall had a very delightful sense of humor. Although he was rather liberal in his political views, I enjoyed him thoroughly. He was from time to time helpful in legislation for the mining industry. I can't remember specifically about that. Mr. Rhoades was a Republican rather than a Democrat, as Mr. Mo Udall was. Both long-term congressmen from Arizona.

Swent: You must have had considerable clout with them.

Fenzi: Well, yes and no. They were independent-minded people and did what they wanted to do, pretty much. They knew what our position was. If they could help us, they usually did, but

not to the--if they felt differently, they didn't necessarily. Our influence in Congress was, I'd say, pretty limited. It was worth the effort to do it.

Swent: You were representing Arizona's major industry, weren't you?

Fenzi: That's right. To that degree, they took us into consideration. But I would say that it was limited, not very --. All the time I was connected with going to Washington, which started, I guess, around 1968--'65 maybe, '66. And then influence in Arizona, which had been fairly substantial prior to the Depression, maybe even in through the Second World War, had gradually eroded over the years. Mining was no longer as important to Arizona. The growth of population in Phoenix, the change in industry in Phoenix, the growth of industry, and particularly the population shift.

When I went to Arizona, they talked of three industries in Arizona: copper, cattle, and cotton. By the time I retired, the principal industry was tourism. Of course, the electronic industry grew then, and the aircraft industry in Arizona. The mining industry was less important to the state, important but less important. [telephone keeps ringing] Nevertheless, we always had lobbying in the state legislature on specific bills. We were able to have some influence on the effort there.

Swent: Do you recall any specific examples?

Fenzi: Well, they were mostly detail bills which were important to us, having to do with water or mining some of the--. So that, of course, played very important on the state level for the Clean Air legislation. The state of Arizona had its own department which monitored our smelters and other activities. There again, we had relatively little influence on what happened, other than some details in some of the legislation.

The Clean Air Act and the Arizona Mining Industry

Swent: Would you like to comment on the perception that many people have that the mining industry in Arizona was pretty much killed by the Clean Air Act at the same time that Cananea was polluting like crazy without any interference? Cananea in Mexico, that is.

Fenzi: It had a great impact on the Arizona industry, but it didn't kill the industry. We had to spend a great deal of money; the

industry in general spent a great deal of money. Newmont built a new smelter with a special process which is not quite the same as Outokumpu but similar in effect. Inspiration built a new smelter, flash smelter. We, of course, transferred most of our concentrating, smelting. After we shut down our smelter in Morenci, we were forced to shut down our smelter in Douglas finally at the end of 1986. So it was affected by the Clean Air regulations. The cost of the new smelter, as I mentioned earlier, Ajo was \$8 million. Now Hidalgo cost \$230 [million].

I might digress: there were investment differences for we had to build a more complete installation at Hidalgo with extensive machine shops, housing, and so forth, which we did not have to do at Ajo, which already had those facilities. So it's not quite comparable, but the smelter itself was much more expensive.

The various arguments in the "papers" between the conditions in Mexico vis a vis the ones in Arizona was brought up many times. It had very little effect on the legislation in the States. In fact, I would say none. Initially, the argument was that Phoenix was polluted by smelter smoke from Ajo, which was found to be wrong. When we had those long strikes and smelters were down, there was clearly no difference in the atmosphere in Phoenix. So it was kind of a device to not face up to the fact that automobiles were the main cause of pollution of the cities of Phoenix and in Tucson, but mostly in Phoenix, which had grown so rapidly and so was large. It was the same condition in Los Angeles, the pollution of autos.

Swent: But Cananea was competing.

Fenzi: Cananea, of course, was south of Bisbee, just directly south of Bisbee. But Mexico had its own problems. The competition in Mexico was more on the basis of the ore body's content, copper volume, and so forth, than it was on whether they had a higher smelting cost, although they did have a lower one in Mexico than they had in the States. That is, up until we shut the Douglas smelter down. Finally that occurred at the end of 1986.

Swent: Why was that?

Fenzi: We couldn't meet the standards. We didn't want to spend the money to build a new smelter there, which would have been required to meet the standards.

Swent: So that was directly caused by--

- Fenzi: Yes, the Clean Air Act shut it down, and to a large degree also the Morenci smelter. It would take another level of expenditure at Morenci to have brought it--we tried various things at Morenci, technical things to improve the situation there, but it would have finally required a full new system to meet the standards.
- Swent: Did they continue to mine?
- Fenzi: Oh, yes. Morenci is our major producer.
- Swent: But just not to smelt.
- Fenzi: They now do the smelting at the Hidalgo smelter.
- Swent: There was a period when mining was slowed down, though, wasn't there?
- Fenzi: Only because of economics, price, and strikes, but mostly economics. The smelting process became more expensive as a result of the new processes, and the inflation occurring, and the fuel, and labor costs. Primarily those two.

The Solvent Extraction Process Increased Efficiency, 1981

- Fenzi: I think the other technology in the copper mining industry was the adoption of a process known for many years but improved over a period of time by people like Mr. Hazen's¹ technique that was developed, and that is leaching and precipitating copper from solution, and by leaching mine waste dumps or mine leach dumps containing copper. Solutions are recovered from the dump. They are rather low-grade in copper.

The Hazen process, which uses prills, which are organic molecules which are put in copper solution, which pick up the copper out of the solution, and the prills are taken out of it, and the copper is taken off the prill, and thereby attaining at a much higher solution strength in copper, which is amenable then to precipitation (electrolysis deposition) techniques, which removes the copper from solution. The copper is deposited on blanks, initially special alloy lead blanks, in the form of a copper cathode. This total technique had been evolving starting shortly after the World War II. It

¹Wayne Hazen, *Plutonium Technology Applied to Mineral Processing; Solvent Extraction; Building Hazen Research, 1940-1993*, Regional Oral History Office, University of California, Berkeley, 1995.

had been known before that electrolytic copper could be extracted, but only from high-grade solutions.

This was a technique used from vat leaching where you had a high-grade solution, like Ajo in 1910. You made copper blanks. Then you refined those blanks because they were not pure enough (usually contained too much lead), not high enough in pure copper, to get a pure refined copper that was suitable for wire and cable use. So the techniques were known, but not a system to use low-grade solutions until after the World War II. Certain mines in Arizona and other parts, in Nevada, used the techniques to make a copper cathode, but these all went through the remelting/refining process before being suitable for sale.

Swent: What were those mines?

Fenzi: The Bluebird was the first one I can remember. They had a plant near Miami, Arizona. And there was also a plant at Baghdad. Those are the first ones that I can remember particularly.

Swent: Those were not Phelps Dodge properties.

Fenzi: Not Phelps Dodge properties. We, in turn, in some cases recast and refined the cathode. It was extra expense, because we sent them to our refinery where we melted them, made anodes for our refining process, and converted to higher purity from a fairly impure cathode that was received from these mines.

Swent: Those were shipped to El Paso, is that right? To your refinery?

Fenzi: Yes. Some of them to our El Paso refinery. Other refineries did it as well. We had some of the business from those companies.

But the first plant in which the process was updated was built at Anaconda's plant in Tucson. They built in an electrolytic and solvent extraction (S-X) plant there. They made a slightly purer cathode than those that were made at Baghdad and Bluebird, because the techniques had been developed further. But still, they were not quite pure enough for wire drawing. They had to be re-refined at our refinery or somebody else's refinery.

Our refining company experimented with the composition of the cathode blank, which is a cathode (negative pole) placed in the solution of electrolytic processing of the copper solutions from these solvent extraction plants. We

developed a better alloy for the blank made out of an alloy of lead. When we started up our first solvent extraction plant at Tyrone, we made copper that was pure enough to be shipped directly to the wire plants. That was a contribution by Phelps Dodge to that process, which occurred in 1984, which helped us to eliminate the refining step, the re-refining step.

Swent: I see. After the flash smelting, then you were--

Fenzi: No, this process does not entail any smelting or any refining.

Swent: This was at Tyrone in--

Fenzi: The heap-leach process, which was similar to the one at Anaconda and the ones previously at Baghdad and Bluebird, did not involve any smelting at all.

Swent: So this was something at Tyrone in parallel with the smelting?

Fenzi: No, they put in a side operation which leached our low grade dumps, which had contained copper from the mining operations, but copper that was not suitable for processing through our concentrator. Before that happened, we had done what they call dump, heap leaching and precipitation on tin cans, which took the mine dump solution, put it over a series of iron cans or other forms of iron, and came out with a precipitate of copper and iron mixture. In other words, copper precipitates, which in turn ran about seventy percent copper, but had to be smelted and then refined. The precipitates were sent to our smelters and then to our refinery and finally made into a pure form of copper.

The S-X system would bypass the precipitation plant and the smelting of precipitates. You would come out with a copper cathode that if pure enough could be shipped directly to the customer, where heretofore the one at Tyrone, using this special anode, was not acceptable to the industry, the copper consuming industry. That was a new breakthrough which eliminated the refining step in the Phelps Dodge process of getting copper from a dump to a cathode.

Swent: And Phelps Dodge developed this themselves?

Fenzi: They used the process which had been developed by others for the initial part of the system, which was the upgrading through the use of prills, and the electrolyzing of the solution to precipitate the pure copper. The only thing we added to it was a better plate to precipitate the copper on, which did not therefore allow lead to get into the copper,

which had happened before to a very slight amount in other plants. So as a result of that, the first plant was built in Tyrone. When it was successful in Tyrone, they built one in Morenci and then expanded the one in Tyrone and then built a new one in Morenci. They now are building, I believe, a third plant in Morenci.

It had the effect that when Tyrone ran out of concentrate, milling ore, which occurred in about 1990, they were able to continue mining operations of material which was lower grade and to put it on dumps and use the S-X plant to extract copper. So Tyrone still operates, only a mine now and an S-X plant. The concentrator has been shut down. To produce copper they bypass concentrating, smelting, and refining. And although we have a mining cost which is fairly substantial, we only have the mining cost and the S-X cost. So it's very competitive in costs with the old system of mining, concentrating, smelting, and refining.

Swent: So the 200 million dollar smelter was a temporary--

Fenzi: No, we still have a lot of production from our concentrators at Morenci. Later on we acquired--in the late eighties--Kennecott's property in Chino area near Silver City. That property produces concentrates to a smelter. But Hidalgo smelts mostly Morenci concentrate and to some degree some outside concentrates from other companies' mines. It is still running at full-out capacity. But we're only operating two smelters now, where we had at one time operated three or four. So we're down to two, one of which we acquired from Kennecott. We operate a Kennecott smelter which has a process which does the same thing as the flash smelting process in the Hidalgo smelter, converting most of the smoke to acid. Only two mines produce material that goes into the smelter, but we have actually added S-X plants at Chino and at Morenci, and of course the one at Tyrone which started up in the early 1980s. That produces copper at about half the cost of the other process, if you exclude the cost of mining. But the smelting, concentrating, and refining costs have been cut it in half.

Swent: Big difference.

Fenzi: A very big difference, and a very material effect on our overall mining costs. Anyway, we've now increased the production of this type of production after starting out initially at Tyrone and then at Morenci up to a fairly high percentage (fifty percent) of the Morenci production and later of the Chino production. In a sense it is additional production. Of course, all of it at Tyrone now that we shut down the concentrator.

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Swent: --talking about the S-X process again.

Fenzi: I was just talking about the S-X. Although I followed the S-X process and visited some of the S-X plants as they developed, and the beginning of the Anaconda plant in Tucson, the fact that the product still had to be refined further and the fact we had ample smelter capacity at Phelps Dodge, and we had not --I wasn't as interested as I should have been in that particular process. It was coming on very strongly at the end of the 1970s. We should have got into the plants at an earlier stage, looking back in time, at least in the late 1970s, particularly at Morenci where we were still precipitating mine dumps and then also at Tyrone. The idea of building a plant was proposed in the 1970s at Tyrone.

Swent: By whom?

Fenzi: By Mr. Art Kinneberg, the vice president and general manager of operations in Arizona. It was put into the things to be considered as expenditures. I guess it was one of those plants that was going to be built at the time I retired. We had come around to thinking it was a good idea to build one. But it was one of the things that I neglected in my efforts to improve our operations to push before I retired. It came into effect later. At a time when we had very little money to build a plant, we finally put enough together to build the one at Tyrone, which has been a great success ever since. That technology has been a great success to Phelps Dodge since we built that plant in Tyrone.

Swent: It has revolutionized the entire copper industry, hasn't it?

Fenzi: It revolutionized the way they look at ore bodies. Now the low-grade and oxide portion of the copper ore bodies becomes an important factor in evaluating the development of a new mine, because it has a great deal more value than it had been in the past. You recovered a little from that source, but very little in the past with the systems we had used heretofore, with the exception of Kennecott, who had a very elaborate leaching system, but not S-X. They started a very elaborate leaching system back in the 1950s at their plants in Chino near Silver City at Bingham Canyon. But that was all precipitation product, copper into iron and then smelted, refined, and so forth. It developed, I would say in a sense, just in time to help the domestic copper industry cut their costs in a major way.

Some Copper Mining Companies Compared

Swent: What about any difference between companies? You mentioned-- you are implying--is Kennecott more innovative, more receptive to innovations than Phelps Dodge?

Fenzi: No, I would say not. Basically Kennecott--well, prior to-- when I joined the industry, I would say that the mining companies of Anaconda, Kennecott, and Phelps Dodge--Asarco was not in the mining business; they were in the smelting business at that time only--were somewhat equally--depending on the individuals who ran them at the mining and plant levels-- innovative or not, depending on that. One of our predecessor companies we acquired, United Verde, which we acquired in the early thirties, had done a lot of innovative things because of the man who was in charge there, Mr. Charles Kuzell, had done a lot of experimentation in a smelter with processes of extracting the different products that went into the smelter, such as copper, of course, but then iron. His came up with a process to take the iron out of the slag as a source of iron. It was done technically successfully.

It had one minor problem that they had a little bit of copper in the iron, which made it "red short," as they say in the industry, which meant that when you rolled a billet out of that type of iron, you had a parting of a near surface layer, because the copper metal concentrates in the skin of the billet and when it's heated gives you a rolling problem. So it was never a process that went into operation, but he did a --and he took the sulfur out, of course, with acid and so forth. He spent a lot of time on that type of experimentation.

The various mills of Phelps Dodge, mill men, tried various devices to improve the flotation of the mineral. A lot of research and experimentation done with different flotation agents which improved the technique materially between the 1920s and the 1940s and 1950s and still improving it to this day with new reagents, new methods of grinding at the time, were tried. An awful lot of experimentation went on all the time with building a device, sometimes fairly sizable device, putting in a system and trying them. There was always that going on in almost all of the mining companies. They didn't keep it secret particularly; they would exchange ideas with each other, between the mining people and the milling people.

Swent: Remarkable openness in the industry.

Fenzi: Remarkable openness in the industry. They didn't feel they were competitors, basically, at that level. And then, of course, the personnel below that, there's not a great deal of transfer between different companies, while they were key people. It was kind of a gentleman's agreement not to raid each other's personnel, or at least offer jobs to other people's personnel. If an individual wanted to go out and work for someone else, he could do so and did so, but they didn't come into the plant and try to hire your personnel during that period, during at least my time in the industry.

But the industry, the adaptation of new processes, varied, as I say, by individual in individual areas, normally taking place when you build a new plant. You built everything new that you knew about into it, and then you went from there.

An example of what has happened is the change from--it started in the Morenci plant in 1942 and expanded in 1943 and '44 to the configuration of the Morenci plant which is today. The production has gone from initially slightly over 50,000 tons a day, with the war expansion, to over 70,000 tons a day in the plant; the grade of ore has dropped, but the grade of the concentrate had been improved particularly, a lot of it very recently because of new reagents and additional flotation units. There a plant that was built in '42, so to speak, has become quite a modern plant. Plus the control system, which had been improved, finally to on-line computer control, things of that type. So production has been improved.

So it's an evolving thing, even though you're stuck with an initial basic plant. That's been true with most other plants in the industry. Maybe not quite as dramatic as the one at Morenci, but similar. The industry, because of the S-X, I think, has dramatically improved its competitive position in the world, so that the copper production costs in the United States are equal to those in most of the other parts of the world, with one exception when you have a very high-grade, large deposit, such as the Escondido Mine in Chile, four percent grade of copper, because of the grade of ore would, of course, be in a position by itself. But most of the operating mines in the world, or the mines in Arizona, the Phelps Dodge mines are competitive with--

Swent: With the low-grade ones.

Fenzi: Well, even a higher grade than Morenci. I guess that's all on that.

VII URANIUM AND ACQUISITION OF WESTERN NUCLEAR, 1950S TO
1980S

A Surge of Interest in Uranium in the 1950s

Swent: Shall we talk about Western Nuclear, then?

Fenzi: We might talk about Western Nuclear.

In the middle fifties, as I remember it, Mr. Page in a discussion with Mr. Lawson--well, background a bit. In the early 1950s, there was a great surge of interest in uranium and the mining of uranium, and the use of uranium into power. Use it for conversion, for use in electricity. There was a great surge in activity in the areas of the West where uranium was to be found, as well as other parts of the world. In the middle of 1950, I think, Mr. Page in a discussion with Mr. Lawson made a decision to put Phelps Dodge into the uranium mining business. Mr. Lawson then started a program to find uranium mines and so forth.

The exploration department of Phelps Dodge at the general manager's level made an effort to look for uranium prospects which occur at least in the Southwest in different types of rock formation than copper. Most of them are alluvium deposits, at least the ones of any importance. We were looking into different geological environment and different geological age for uranium occurrences, which we did in various parts of Arizona and later in Wyoming and New Mexico.

But in doing this, I guess Walter Lawson had the idea of acquiring a uranium company, which was in the mining uranium business. I think his exploration people met Bob Adams, and subsequently Walter Lawson met Bob Adams. He proposed some kind of a joint effort arrangement, ultimately it resulted in the acquisition of Bob Adams' company, Western Nuclear, who was operating some uranium mines, specifically in Wyoming. So with this new acquisition, we acquired production of uranium from mines.

- Swent: Did you go up to visit the mines?
- Fenzi: Well, I went up to visit the mines after I moved to Douglas as assistant to Mr. Lawson. I'd go up there to pay visits to--met Bob Adams, visited his mine and visited the prospects of our own exploration geologists.
- Swent: Where were these mines?
- Fenzi: They were in the Crooks Gap area, which is really a very small junction in the highways in south-central Wyoming. It's not near any particularly big community. The closest major community was Lander, Wyoming, which is in the western part of the state. Our people that were working up there lived in Lander, drove out to the various prospects, which were east of them on this rather broad alluvium area. That's where Bob Adams had his mining operation.
- Swent: Was the mining similar to what you'd been doing in Arizona?
- Fenzi: The mining was quite different. There were several types going on at the time. Anaconda, fortunately for them, had found a very major uranium deposit in Grants, New Mexico, and they were mining it about the time we started getting into the business. It was an open-pit operation, that one, and they mined it and sent it to a processing plant which extracted the uranium, yellow cake, so to speak, from the ores which was a product of mining and processing at their place, and made, as I remember, a great deal of money on that uranium operation. The yellow cake was sent to a government owned plant to produce enriched uranium for power plant use. Uranium fuel is very carefully monitored and accounted for by the federal government.

There was a smaller open-pit mine and processing plant up in Wyoming run by Utah Construction near the area where Bob Adams had his operations, which were all underground. An open-pit operation, very similar to the one at Anaconda, much smaller in volume, but a big producer.

Mining Alluvial Gravels

- Swent: But were the Western Nuclear mines similar to what you were doing in Arizona?
- Fenzi: No, they were not, because they were in an alluvium material, gravels. Some consolidated and some not so very well

consolidated. So the mining was different than the hard-rock mining that we were used to.

Swent: In what way? How did it differ?

Fenzi: The ground tended to be somewhat unstable, so you had a lot more timbering to do.

Swent: These were underground mines?

Fenzi: Some were--yes, the ones of Bob Adams were underground mines. Some of them had good standing ground, so they could be opened fairly easily. Uranium occurs in zones rather than solid veins; it can be compared to the kind of occurrences left by retreating tide debris on a beach, in waves of material. Because what happens is that uranium deposits come from granites originally through erosion runs down into these alluvium plains, and then meets neutralizing solutions of water which precipitated it into wavelike deposits, so there are kind of pods of higher grade uranium without a lot of--some continuity, but--many times individual pods.

So it's difficult to find them, although they do have the ability, through the use of the Geiger counter, to locate places that emit radon gas. So it may indicate uranium nearby.

Swent: Were you having to retrain people? You were just taking over the Western Nuclear people?

Fenzi: Retraining--our exploration geologists improved their knowledge of what these deposits, how they occurred and where they might be found, and of course, set up exploration teams of the various crews would drill various areas they thought were likely. Geiger counter was very important. Most of them that were discovered were shallow deposits originally, and our people learned the technique to do it. It was different, it was a different type of geology, it was a different type of theory.

Swent: Were you learning anything?

Fenzi: My learning was only by visiting, seeing what happened. These people would explain to me what had occurred geologically, and the mining techniques needed to--and some of these--in Wyoming, the gravels are fairly well consolidated. Mining was relatively easy there underground. It would stand, the back would stand pretty well.

Swent: Had they already made the marketing arrangement with WPPSS [Washington Public Power Supply System]?

Fenzi: No, that came later, as did a large contract with Westinghouse.

Swent: I was wondering if that had any effect on you and your relation to that. Western Nuclear sold its uranium to the Washington public power system.

Fenzi: We had a number of customers in the 1970s, including Westinghouse and WPPSS. The uranium demand occurred following World War II in the early fifties when the power companies decided to build uranium, or what we now call nuclear power plants. There was a great emphasis on this, and the companies like General Electric and Westinghouse built the power-generating units that used uranium and converted it to heat, and then into the regular steam. And then from there on, once they got the steam, they went into turbines the same as a standard power plant. Enriched uranium was used as a source of heat, basically.

There was a great impetus here, and although there was uranium being mined in Canada and Africa, the United States knew they had some, but nobody knew how much. Then the mining companies and many individuals started looking for uranium on weekends, as you may remember.

Swent: Were you aware of this personally?

Fenzi: No. I knew it was happening, but I wasn't terribly interested in uranium at that time.

But anyway, Phelps Dodge got interested, thought they ought to be interested, and got interested, as I mentioned to you, and acquired Western Nuclear. And it continued to look for uranium deposits. But then once we got Western Nuclear, we then used Western Nuclear's geologists, augmented by some of ours, to do the exploration for uranium, which was in different areas of the state than the hard-rock deposits.

So we started producing uranium and started selling uranium, as Bob Adams had already done before we acquired his company. Our customers were obviously power companies, various ones, in some cases. One of our customers was Westinghouse that would buy uranium to furnish to their clients who were building a power plant, a nuclear power plant. So they had contracts with Westinghouse to furnish the uranium for the initial fuel load for these individual plants.

It was quite a boom--they were building them so fast, the price of uranium increased rather materially over the period of 1955 into the sixties. We at one point, I guess New England Power, that complex there in New England, I think to this day

have about 60 percent of their power generated by nuclear plants. And then, of course, the one down in Pennsylvania built the Three Mile Island plant. Nuclear plants early were built around the New York area, and New England, the first plants, and then others were built around the country. The demand was strong in the early sixties, and remained strong until the incident at Three Mile Island in Pennsylvania.

Internationally, the French converted to nuclear, and I think in France, sixty percent of their power is generated by nuclear power to this day, today. Germany had some plants, England had quite a few, and it was thought to be the power generation of the future.

Then I guess in the United States, the incident at Three Mile Island, where they had a leakage of radioactive water from one of their systems, which by the way never--no one has ever had any health hazards from--

Swent: No one was even injured.

Fenzi: No injury and no health hazard from that one. But it scared the population of this country, along I guess with the environmental development of political interest in this country to the point where it was very difficult to build a nuclear power plant and very costly because of two things. One was the further stipulation on how they were to be built. The fail-safe devices to be put into nuclear power plants specifically, which are to the point of great cost and probably beyond need. And the general reaction to "a nuclear plant in my neighborhood" after Three Mile Island. So it's difficult to get "site" acceptance in most states; it takes a long, laborious procedure. So a nuclear plant now takes at least eight years to build from the start of conception to finished product.

Deterioration of the Uranium Market in the 1970s

Swent: So how did all of this affect you?

Fenzi: What happened that affected me, or us, Phelps Dodge, was our market in the seventies seriously deteriorated, because of a reduction in nuclear plants to be built. And our ore reserves had always been rather limited, quite limited. Western Nuclear had small deposits here and there, and we were never able to find any large deposit. We found other small deposits here and there in New Mexico, near Grants. There were other small

deposits in Wyoming. We looked other places, and found an open-pit deposit on the Spokane Indian Reservation where we built a plant, but it also was small. So our uranium operation was expensive; our costs were high. So you might say we never made any real money, as they say, in mining and selling uranium.

Swent: How many years did it last?

Fenzi: It lasted from when we acquired it in the late 1950s, we finally sold it off in the eighties, I believe. It was after I retired.

Swent: But you were overseeing it?

Fenzi: Yes, I was involved in the uranium during all that time I was--

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Western Nuclear Corporation: A Separate Company Within the Company

Swent: We were just talking about your uranium venture with Western Nuclear. You were saying that you had your meetings in New York; was this a separate division of the company?

Fenzi: Yes, it was a separate company within the company. It was a corporation--Western Nuclear Corporation--within the company. It wasn't a mining division, per se. But we had an operating board, an internal board. I spent a lot of time in Western Nuclear, visiting their properties, talking to their people and so forth. Bob Adams stayed on for a while until he died in the middle seventies--I don't remember what year it was he died.

Westinghouse Uranium Contract Repudiated

Fenzi: Western Nuclear had the contract with Westinghouse, which they repudiated; this happened in the early seventies. It was one of those long-term contracts, subject to escalation. No doubt quite expensive, because of inflation in the 1970s, and drop in uranium prices because of the falloff of the building of new plants. So Westinghouse just defaulted on our contract. We never went to court when they notified us they weren't going to

take any more of our uranium, but our long-term relations were severely strained.

Swent: As far as the contract?

Fenzi: As far as the contract. For they built an elaborate defense of why they wouldn't take it, accusing us of anti-trust actions, etc. So were our relations with Westinghouse--who had been a customer of Phelps Dodge for years--they bought copper from us. As I said, as a practical matter we continued to sell copper to Westinghouse--but with Westinghouse it was never quite the same after they withdrew their contract.

Swent: But you didn't get involved in the litigation.

Fenzi: Well, we didn't really litigate it; we finally just said okay. We weren't going to court to enforce our contract. So we never litigated it.

Personal Relationships Affected

Swent: Were you involved in that personally at all?

Fenzi: It affected my relation with Westinghouse, people I had known in the business because they had sold us equipment for our mines, they were one of our suppliers of generators and electric motors and things for our operations. So over the years I had known quite a few Westinghouse people who were engineering salesmen, after moving to New York some of their top people. It affected that. Personally, I gave up on their annual invitation to play golf every spring at one of the local clubs. I used to do that, but after this happened I "bought out." I personally just felt--I didn't appreciate the company's attitude--even though these people had nothing to do with repudiating the contract.

Swent: This is a golf club in New York or in Arizona?

Fenzi: Wingfoot, New Rochelle. Used to play golf down there with them, and it was fun for me. But following this episode I decided I wouldn't any more. So it affected that, longtime relations, because I also knew the president of Westinghouse. George knew him better than I did, but he would see him at certain meetings. So it affected that relation. But we never went to court. But it also had a lot to do with the economics of Western Nuclear. It was quite a blow to--it was hard to

sell uranium at that time; a good part of our sales were suddenly lost.

Swent: Something that I read made me think that this failure up in Washington State--that power plant was devastating to Phelps Dodge, but perhaps that's not correct.

Fenzi: They--I have to think a moment.

Swent: It was a power plant that was constructed badly, as I remember. They--

Fenzi: It was power source in the state of Washington, other than the Grand Coulee power--it was a state of Washington power utility.

Swent: It was a great scandal.

Fenzi: Yes. Fortunately, at the time, we were peripherally involved, because I think some of our uranium was going to one of their plants. And Westinghouse was involved in that. Yes, it was an economic disaster, and the bonds were repudiated when it happened. The WPPSS bondholders were left holding the sack. So it was quite a thing at that time. Some of our uranium was going to be bought by the power plant that they had built, among other things--it wasn't all that they did. So it did occur; it was part of the fallout after the falloff in the desire for nuclear plants. Their cancellation of our contract occurred in 1981, but we took them to court and received a favorable ruling--they paid us twenty-five million dollars to cancel our contract. With this cancellation, however, our uranium sales fell materially.

The other factor which was even more drastic than Western Nuclear's difficulties was--General Electric and Westinghouse had quite a big business in building nuclear power plants. They have finally shut all those down--I think Westinghouse builds a few now, and sells them around the world, internationally. G.E., I think, has stopped entirely any research or further work on nuclear power plants, which I think is too bad--not only too bad, but it's a serious detriment to future power needs. They were getting to the point where they were having some very sophisticated power plants available for power generation. Those two companies had developed the nuclear power industry in the U.S., and had sold many abroad, some to France and Japan, etc. I guess maybe Westinghouse still does. We no longer have the capacity in this country to build nuclear power plants.

VIII VICE PRESIDENT, DIRECTOR, PRESIDENT OF PHELPS DODGE, 1962
TO 1983

Headquarters Moved to Phoenix from New York, 1987

Swent: Were you involved at all in the decision--or how did it affect you--the decision to move the headquarters from New York to Phoenix.

Fenzi: No. That happened after I retired from the board.

Swent: Were there forewarnings of this years before? Had it been--

Fenzi: Every corporation studies where it puts its headquarters, and periodically we used to study in New York whether we would move our headquarters out of New York. Some of our other mining companies did so: American Metal Climax (AMAX) moved their headquarters up to Greenwich, Connecticut, you may remember, and Texas Gulf Sulphur moved their headquarters to Stamford, Connecticut, in the seventies. Others have studied whether to move out of New York City or not. And New York City had some disadvantages and a few advantages, obviously. Advantages of it was that you could meet with the financial community more readily if you were right there in New York City, at least your top officers could. The disadvantage, of course, was it was expensive to operate in New York City, and rents and taxes were higher in New York City--in fact, in New York state--although corporate taxes were lower than Connecticut, particularly in the--

So we would study it, but we had not considered moving it all out to Arizona because we had a manufacturing operation, which headquartered in New York, and their plants were much closer by New York. We even had a refinery right there in New York City--copper refinery, and we had a plant right across the river in New Jersey--fabricating plants, wire plants. And up the river in New York we had two cable plants. Up to that

point when I retired, we controlled our mining operations from Douglas. After I retired but was still on the board, we moved Douglas Headquarters to Phoenix, in 1983. The Board approved that move in 1981 when I was still on the board; however, I was not on the board that decided to move corporate headquarters from New York to Phoenix in early 1987, after George Munroe retired as CEO.

Swent: What went into that decision?

Fenzi: Well, that was a feeling that we should be closer to the state capital, I think. I think it was the idea that they ought to be closer to the legislature--the politics of the state. And Phoenix was growing very rapidly. It was the center of the state of Arizona. Population was growing very rapidly. Also economics--there was considerable cost savings in consolidating our corporate headquarters with our western mining headquarters.

Positive and Negative Effects of the Move to Arizona

Swent: How did you feel about it?

Fenzi: It was obvious on an economic basis it had a lot of sense. I don't know from a public relations basis, I really don't know. The financial community no longer is as interested in--or doesn't come and see our people as much since we moved to Phoenix. I mean analysts, and people like that. Banking relations, I don't think it made any difference whether we moved to Phoenix or not. But I think perhaps the public--in the stockholder area, it did have a somewhat adverse effect. From a people standpoint, it had some negative effects.

Some left us at that point--the New York people; they didn't want to move to Arizona. Some weren't offered a job to move to Arizona; they were given benefits and early retirement, things like that. I think it means a little more traveling for our top executives in the manufacturing operations, but not a great deal. Our directors were scattered about the country, so it didn't make a lot of difference. Depends whether you like Phoenix better than you do New York, I guess, for the individual people. Corporate headquarter location is usually decided by the CEO. I don't know--but that was the decision; I was not involved in it.

The Copper Oversupply and Resulting Crisis of the 1980s

Swent: Why were they under such financial pressure at that time?

Fenzi: Well, not at the time the corporate headquarters moved in 1987.

When I retired, the price of copper was a dollar a pound. In fact, it had just in that previous year gone up as high as one dollar and forty cents. It was falling. And so in the year 1980, we made a respectable profit; made ninety million dollars or so. But next year, the prices dropped down to eighty-four cents a pound; our profit had gone down accordingly, to over sixty-nine million. The following year, 1982, we went in the red, seventy-five million, substantially. Of course, by 1982, with this drop in prices, we had started doing what we could to reduce our costs and started selling off assets that were not germane to our main business, copper. And by 1982, we were very much into losses--because '83 was again a loss year. And '84 was a disaster, just barely profitable, into a nominal black again. In 1985 copper prices were even lower, but efficiencies had improved and sales volume was up. So that period, 1982-85, it was a very tough period. Starting in '81 and through '84, Phelps Dodge took very drastic decisions--selling assets--reducing crews, etc.

Swent: How did you feel about all this?

Fenzi: I was on the board at the time, and we--I remember one thing we did specifically was freeze top salaries and take no director's fees. I know the board of directors all gave up any remuneration for that period starting in '82 and also eliminated the dividend in mid-1982. No raises for anyone in the higher salary levels, and started reducing staff here and there in various places. So I was very well aware of what was going on. The board was kept informed when decisions came to the board to be made, why, we were involved in those decisions, I wasn't involved with it other than as a director. However on many occasions I had personal discussions with George Munroe and some of the other officers.

So it was a very trying time and a very strange time, because it was different--in the depression of the 1930s, demand for copper had almost evaporated--not quite. Prices of course dropped sharply, to as low as five cents per pound. All Phelps Dodge mines were shut down except Bisbee, which operated because of gold credits--practically no copper sales were made by the company. So that was a depression of economics of low activity.

But the recession in 1981-84 was the result of slight over-production and a price squeeze; a lot of new capacity was built in the seventies in the United States and abroad. And those properties abroad were--some of them came on stream just about the end of the 1970s. Although there was a slight recession in the copper industry in the early 1980s, there was still demand for copper; it stayed fairly strong. But the fact there was an oversupply and the inventory of the world--copper stock grew. And the speculators, of course, knowing there was oversupply over demand, took advantage of that, and they sold short, as they say; the price of copper plummeted so that it was down finally in 1984 in the sixty-cent range even though world demand was rising. Copper demand increased, actually, in '83 and '84, and the price stayed the same because copper stocks were still overhanging the market. It wasn't until 1985 that the inventory started coming down and the prices started to improve. We could sell all our copper, but at a reduced price--so it was a rather strange, "stagflation" economic situation in our particular industry (copper).

Phelps Dodge Policy to Cut Back Production

Swent: Did you consider holding your copper for a future time?

Fenzi: Our philosophy, basically, is that you can't hold copper even in company stocks without depressing the price, so we don't produce it; so we cut back. We did that many times during my time with Phelps Dodge, particularly when I was in the operations out west. We would go back and forth from a seven-day schedule to a five-day schedule.

Swent: So that was the way you responded to--

Fenzi: And that would change our production by schedule changes, by twenty-five percent. That happened generally throughout the copper industry; the other producers would also do it because they didn't want to produce copper which nobody wanted to buy. So there would be a variation all over the world of this kind of thing. When times got tough--during part of the Eisenhower period, there was not a great deal of demand for copper--at least reduced demand. What happened then was most all the companies around the world reduced their production.

Swent: There would be a time lag.

Fenzi: Always a time lag, and there was always a surge in price in the middle of the time lag. Which affected it. But when we saw

that stocks started to build in the commodity exchanges, we started thinking about cutting back. At the time of that policy, we also watched our building wire sales; if they reduced purchases, we thought about cutting back.

Swent: Were these decisions made at the board level?

Fenzi: No, at the corporate level. They were not made by the board; they were made by the CEO, but in most cases, the board was notified. They knew about it, obviously. The head of Phelps Dodge made the decision whether we were going to cut copper production or not. He would tell the general manager out west that he was going to cut production. That decision was always made at New York, and it was done many times over the years that I worked for Phelps Dodge. We cut back our operations in the early seventies; it was a poor demand period. Sometimes for a year, sometimes for a number of months. Made a big cutback in production in our mines in 1938. Morenci wasn't operating, but the ones that were, they cut their production--again in 1949--postwar recession. So it was a traditional procedure. But in 1981, the world producers did not cut their production. Although some of domestic producers did.

Swent: And that was a significant difference.

Fenzi: That was a significant difference, so they had this kind of a peculiar situation which hadn't been quite matched before. During that period in 1982, we shut down all of our mines for several months. Opened up shortly in 1983, and then shut only Ajo down again in fall 1984. Of course, Bisbee had been shut down much earlier in the seventies--partly the depleted ore reserves, and also economics; early seventies was a tough period for price. Bisbee copper became more expensive than they could sell it. So we shut Bisbee down in the early seventies. Price definitely affects the ability to operate.

Successor to George Munroe

Swent: You became president, but not CEO. What would be one of the differences there?

Fenzi: I think it was small, mostly cosmetic. I think the board, on George Munroe's recommendation, decided to give me the honor of being president, even though the duties didn't change, basically.

Swent: These are interesting distinctions in titles sometimes.

Fenzi: In 1966, when George Munroe was made president and I was made executive vice-president, also elected directors, Mr. Page still stayed on as chairman and chief executive officer. And he didn't give up the chief executive office until a couple of years later--I guess it's '69. At that point, George Munroe became chief executive officer and president, which he already was. But our duties--our relations between George and I, after Mr. Page stepped down as chairman, changed in the sense that Mr. Page was no longer in charge of Phelps Dodge--he was there, and we saw a great deal of him. And we still deferred very definitely to his recommendations. Theoretically and practically, George was making the chief executive decisions. And then when Mr. Page died in late 1970, it was just George making the decisions, and I was very closely associated. The two of us were closely associated with corporate decisions: he made them, and I concurred, as I said, or was involved in them from there on out until I retired. So our relationship was the same all through that period on--1970 through 1980. The titles changed in 1975, that's all. George Munroe became chairman and CEO when I was elected president.

Swent: That was the only change.

The person at the top has a great deal of influence in a corporation.

Fenzi: They should, or they shouldn't be there.

Swent: I think the character, sometimes, and the personality--

Fenzi: Oh, the character sets the tone. There's no question. George was a very unusual man; he was very bright, good common sense, very honest. He was very patient and very thoughtful of what his decisions were going to be. But he definitely made his decisions. All of which are good attributes. He had a very gracious personality.

He was an excellent speaker, which was helpful during the "environmental" hearings when we had all the hearings about the smelters and smoke such as that around the country, and especially in Arizona. He went to those hearings, and they were a very unusual type of hearings; big crowds of people, all wanting to talk about whether the smelters should be shut down. And they gave equal time to anybody who wanted to speak, so the corporate president had as much time as anybody else that wanted to speak, but no more. So they were very difficult hearings, but George Munroe was a very able--and not flustered by all those people, which is a good characteristic to have in those positions. So he had a very good influence on Phelps

Dodge, and was the key to Phelps Dodge's success in meeting the environmental political pressures of the 1970s.

However perhaps his greatest success as leader was planning and executing the "tough decisions" so that Phelps Dodge survived the copper industry's depression 1981-1985. He had the ability to motivate his subordinates and get excellent results. As did his predecessors.

Mr. Dodge was still living when Mr. Page died. He [Mr. Dodge] passed on in November 1982 at the age of ninety-four. In fact, I went on a tour of the properties with him in the spring of 1981. He had already retired in 1966 but remained an honorary director until his death; he wanted to go visit the properties. Eleanor and I went with him and his grandson.

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Fenzi: --to see all the mining properties in Arizona and New Mexico. Very delightful man, a "real" gentleman, and very influential.

Swent: The company's been headed by a long line of fine gentlemen.

Fenzi: I thought so.

Swent: It has that reputation, anyway.

Fenzi: They all were very able--fortunately for Phelps Dodge. [lunch break]

The Metcalf Mine

Swent: We're continuing now after lunch, and we'll have to go back a little bit and fill in a few gaps if we can. You had mentioned the Metcalf mine.

Fenzi: A little background on the so-called Metcalf mine, which we developed in the early 1970s as an adjunct to the Morenci operation.

Swent: How far is it from Morenci?

Fenzi: Metcalf is approximately, by air, about three miles from Morenci. It's quite a bit longer by road. But the Metcalf district was a very active district starting in 1900. There were a number of mining companies operating there and a fairly substantial town, Metcalf, which was there when I first moved

to Morenci in 1937. People were still living in Metcalf and there was a very large school building with a white tile exterior. But unfortunately, in 1937, in the mining plan for the Morenci mine, it necessitated using the Metcalf area for part of the dumping of waste products--at least in the area of Metcalf; in the side canyons. So the housing in many cases was moved, some to Morenci, some to Clifton. Bodily moving the small houses, and the abandoning of other houses and the fine school building which weren't movable, so to speak.

The Coronado mine, which was in a side canyon of the Metcalf town canyon, was an unusual mine which was one long five-mile copper vein. It had five different mining operations--shafts. That operated until into the twenties, at which time--it was '21, I guess, it was shut down by that Depression--Phelps Dodge had acquired it at that point--along with the other mines, the mining companies who operated in Metcalf. So it was always thought that the Metcalf area would be a further expansion of the Morenci operation at some point. Following the Second World War, when I returned to Morenci, Mr. Lavender, vice president and general manager, authorized the beginning of exploration--drilling on the Metcalf mountain, across the canyon from Morenci, which we started in 1949.

As a matter of interest, one of our new geologists, Dick Moolick, was put in charge of the selection of drill sites for this initial effort. He did a geological survey of the area first, and we were building drill roads for access for the diamond drills to be used on the drilling of the area. And when he was asked to pick a site for the first drill, it was a very fortuitous site where we got into 1800 feet of copper--minable copper grade material. Probably the best hole in the whole mine that we ever encountered. Anyway, we were off to a good start in our initial effort to explore the area, which was continued through the 1950s and into the 1960s. The mining plan then being developed, most of the mining plans were mostly formed in the 1960s after I had moved to New York, although I followed them closely.

At the time of the mid-sixties, we decided to expand Morenci, and the decision was to open a new mine at Metcalf and build a new concentrator near the present concentrator at Morenci. But at the beginning of the seventies, the copper market--particularly '71 and '72-- there was kind of a recession. And so although we had started the development of the Metcalf mine-stripping, and they were beginning to think about starting construction on the new mill, it was deferred about a year. At that point we even studied the possibility of a vat-leaching operation again--interesting enough--but decided that a regular flotation mill should be built, which was done

and completed, I believe, in 1973 or '74--it went into operation.

Swent: Were there other options on the location of the mill?

Fenzi: No, there was only one place we could put the mill because of the topographic features: very steep canyons near the Metcalf mine, so there was no place near Metcalf, where we could put the mill or the treatment facility. We put a crushing plant at Metcalf, in the bottom of the canyon, where the old town had been located. And the railroad connection between that location and the new mill which was built beyond or west of the original Morenci mill, used a unit train type haulage, where we had bottom dump cars only for the crushed product and transported it crushed to the new mill site--rather than crush it at the mill site, as was the case with Morenci. In any case, that added another forty thousand tons a day, although it was nominally about a forty-thousand-ton operation when it first started up and has been increased over the years to over fifty at least today.

Swent: That's fifty thousand tons per--

Fenzi: Of ore treated per day.

So we had two expansions of Phelps Dodge operations--one at Tyrone, and one at the Metcalf mine at Morenci--taking place in a matter of two or three years in the early seventies. At the same time, in '73 about, the ores at the Bisbee--at Lavender pit--ran out, so to speak, and they shut that mine down. When the Lavender pit was originally started, they expected a ten-year life, but it ran about twenty years, actually, before they ran out of reserves. The Bisbee underground operations were becoming more and more expensive, and due to the price of copper, we were in a position where they were no longer viable; we shut those down also, at that same time. So we lost production capacity at that location, about the time that Metcalf mine came into operation, which was quite fortuitous as we were able to transfer most of the supervisors and a lot of the mill operators to Morenci to man the new Metcalf mill. And it started very smoothly.

Water, a Key Element in Mine Planning

Fenzi: Digressing into an entirely different subject, but-- water sources for Morenci, and then water for mining in general in Arizona, was a very key element for starting any operation.

When they first conceived the idea of an open pit at Morenci in the late twenties, they thought they had enough water coming down the canyons there to sustain the operation--which was Chase Creek, just parallel to the mines at Morenci. But when they thought about it in the early thirties, Mr. Cates and others didn't feel that there was enough water to assure the production at Morenci. So in the 1930s a great effort was made to find and obtain water rights to run the operations.

Swent: What were the needs? Why did you need water?

Fenzi: Flotation, specifically, requires quite a lot of water to pulp the ground material so it can be treated by flotation. Now, of course, in the Southwest, there had been developed a fairly efficient system of recycling all the water that could be possibly recycled to save water and reuse it in the process. And our tailings dams were designed to reclaim the water in the tailings which were sent down there and return them to the mill. This process returned about eighty-five percent of the original water to the system. But you lost the other fifteen, and that still was a pretty high volume amount of water with a mill that was going to run fifty thousand tons a day. So the original needs thought to be for the Morenci district were somewhere in the range of ten thousand acre feet a year as its volume of water. An acre foot is a volume of water covering one acre of ground, which is approximately 325,000 gallons of water. One foot deep on an acre of land is the definition of an acre foot. It would take about ten thousand acre feet for the Morenci operation as originally conceived, to operate it.

So various efforts were made. They at first drilled wells in the Eagle Creek area, which is a neighboring area where the domestic water for Morenci had come--and the mining water also--out of a stream--about ten miles away--that paralleled the watersheds emanating from the White Mountains, at some height behind Morenci. Then even underground drifting was tried at the various springs that they had in the Eagle Creek area; they tried to develop enough water capacity that way to be successful in fulfilling the needs of Morenci. These proved to be inadequate. So then they decided to go to the idea of buying water rights, or acquire them through some effort of some type.

Engineers at that time involved in the water suggested--then it became a statewide search with an idea of exchanging water from one watershed to another watershed. And that idea developed into an arrangement whereby we would add height to some of the state dams over in the Salt River Valley water system thereby increasing the capacity of years of high rainfall, and transfer that right over to our watershed, which

was the Black River, some thirty miles by air from Morenci--quite a bit further by road. And that was worked out in the early forties. Probably the fact that there was a war in progress had something to do with some settlement of that arrangement. Anyway, it was done, and they put in a pumping plant at Black River, which then pumped water from Black River to the watershed of Eagle Creek--this is the nearby stream that goes fairly close to Morenci, and where our domestic water had come for many years. And that water was then picked up at Eagle Creek and piped into Morenci.

Swent: Sounds like a massive engineering job.

Fenzi: A fair amount of engineering, and, of course, a lot of legal and property negotiations; water rights are very precious items in the Southwest. They're not achieved lightly.

Swent: And if you tack an extra foot on a dam, don't you have to strengthen down below as well?

Fenzi: It depends on what was necessary, whatever the proper engineering structure was designed and done, and it worked quite well. We obtained long-term storage rights in a dam known as the Horseshoe Dam on the Salt River complex water system. In the early 1950s, we conceived the idea of drilling some wells below our tailings dams with the idea of reclaiming any underground water that was likely seeping through. And this turned out to be true sources of additional water; however, it was not entirely the tailings dam water involved, so it required negotiations with the downstream farmers in Arizona--particularly in Safford--to use this water that we obtained from these wells. And that was negotiated in the middle 1950s. And we had to then develop the wells and pipelines to pump this water back in with our reclaimed water from our tailings dam system.

In addition to that, Mr. Barker, our manager at Morenci, was up on the area north of Morenci deer hunting one season; he didn't get any deer; he was mostly enjoying the outing. But he was up there in this area, and he looked at this large basin up there and thought that this might be a source of water. So as a result of that he got permission to spend money to drill wells in this area. And we were successful in finding some very productive water wells. As a result of that particular effort, we were physically able to pump water from that area and also back into the Eagle Creek drainage area, picking up again near Morenci at the pump stations. At this point, a majority of our fresh new water was coming from that source, along with certain transfers during the wintertime from Black River. This impounded on the question of whether you are going

to expand at Morenci, and the fact that we had this earlier water available to us--we had sufficient water to support roughly a forty-percent addition to our production needs at Morenci. There's no question that water was very essential to the Morenci operation.

Swent: Of course, if you hire an extra few hundred people that means a lot more water for your town needs, too, doesn't it?

Fenzi: It's interesting--if you know much about the use of water for different needs in society, the biggest consumer generally is an irrigated farm; for example, the valley out here, the San Joaquin Valley consumes a great deal of water in irrigation. In the case of Arizona, a great deal of water is consumed by the cotton farms, etc. A house without much of a yard consumes a reasonably small amount of water, although it's obviously a very definite need, as we know from our dry periods in California. Industrial, such as mining, because of the recycling of water--consumes a lot of water because of the volume, but on the basis of the process it's not a very large amount. The result is that you have kind of a division that--in the case of the complex of mining, milling, smelting, and town site needs--about sixty percent goes into the concentrator, about fifteen or twenty to the mine and smelter, and to the town site maybe ten percent of the total. These are very rough figures.

Swent: But proportionally, it's much less. Did you restrict the water use of your people in your houses at all?

Fenzi: No, we didn't restrict the use; they could use what water they wanted to. They paid a bill for water consumption, as they did for power to the local utility company. So it was dictated somewhat by economics; it wasn't expensive water, but people were careful. But some had very nice gardens, and some didn't have gardens.

Swent: It was metered.

Fenzi: Yes, each house was metered.

One other try was made in 1937, at the time I arrived in 1937; it was to sink a shaft on a hot springs, which was on our company ground in Clifton, which was the town down the hill some six miles away. A mining operation, really--underground drifts into the water; but that again did not develop enough water to meet our needs. That water was salt water, and we did put a pipeline from that source up to the mill. Salt water didn't affect the milling system particularly, so we used that

from time to time as an emergency source of water. But there never was a very big use of the water from that area.

Swent: Did you treat the water for the personal use of the people? Did you fluoridate or chlorinate it?

Fenzi: We chlorinated the domestic source of water in a separate reservoir for domestic water.

Swent: How about sewage?

Fenzi: We built sewage plants in town along with the new housing, so we treated our sewage in a conventional treatment plant. So no water emanated from that area. Although sewage water, once it was treated, finally ended up in the mill recycling system.

Developing a Separate Exploration Department

Fenzi: After I moved to New York, we continued--well, let's talk a little about exploration. Up until 1950, the exploration done by the corporation was done out of the western headquarters, but really relegated to each individual mine because it was confined primarily to exploration around each individual property by the local staff. They had geologists for various activities, both for the mining activity and ore controls, and also for the small exploration activity, such as the Metcalf mine, which was geologized and controlled by local geologists. In the early fifties, it was thought desirable to have a more general exploration program, and Mr. Lawson, who was in charge of that general activity, felt it should be set up as a separate department headed up by a separate individual--not connected with the mining operations, subject to the financial controls of the New York office, a separate entity with corporate funds allocated from New York, and run by a competent exploration geologist. That program was started around 1956, I think in part because of the interest in doing the uranium exploration, which was put under this new exploration department after the initial effort by Mr. Lawson himself and his local geologists.

Swent: This was after the Korean War, then.

Fenzi: Just after the Korean War, it was established as a separate department. And the individual who had headed the department was headquartered in New York.

Swent: And who was that?

Fenzi: It was Herbert Stewart. He had come from the Bisbee operation, he worked in the underground mines at Bisbee as an engineer and geologist and operator. He had been selected in 1951 to go to New York for the benefit of Mr. Page, who wanted somebody in New York who had a mining background who he could talk to locally and discuss mining problems and evaluate from there. So Mr. Stewart went to New York in 1951; he was there until he retired. He was selected as the man to be the first head of our general Phelps Dodge exploration department. So that was when I moved to New York, that was one of my general duties was to interface and supervise Mr. Stewart. Although he reported regularly to Mr. Page.

Swent: Where was this exploration effort?

Fenzi: It started out very slowly; we set up a department in Douglas, which was near the headquarters at that time. And the geologists and geophysicists which were hired by Mr. Stewart were located in a building near the main office. And that's where they resided until the team was moved--until the main office moved to Phoenix many years later, and the exploration office moved to Tucson. He started to set up a program in the various states of the Southwest first, primarily Arizona and New Mexico, with small offices in other states, like Nevada and Wyoming, for uranium and so forth. Also had a small office in Salt Lake. Then started to go overseas to look for properties, and he hired a mining engineer/geologist, William Brown, who had exploration experience, who in turn started looking in places like Africa and Australia, primarily.

Swent: South Africa?

Fenzi: South Africa and other parts of Africa.

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Fenzi: In the latter part of the 1960s--

Swent: Was it at this time that you went to Africa yourself to visit?

Fenzi: I did not go to Africa at that time. At the latter part of the sixties, Mr. Stewart was assigned to be my assistant in the office. Mr. Brown was promoted to be the new head of the general exploration department. He made trips to Australia and South Africa to look into how we set up an exploration program in those countries. He found a man in South Africa, Patrick Ryan, a South African and a doctor in geology who had been in exploration down there for some years, and recruited him to be the head of the operations down in South Africa. We thought it would be a good place to look for minerals. Then we hired a

local geologist in mining in Australia, also--to head up an exploration program specifically to Australia.

Two Mines in South Africa

Fenzi: Patrick Ryan was successful in finding a number of prospects in South Africa, one of which was a very large lead deposit in the northwestern part of South Africa. George Munroe and I went down to see this prospect in 1974 with Mr. Brown; we visited the site. He also found a very nice fluorspar deposit in the eastern part of South Africa, which we also visited at that time. It was the Witkop mine and mill.

Swent: These were not existing mines?

Fenzi: Both were new discoveries and were developed subsequently; the one in what we later called the Black Mountain--that deposit was negotiated with Gold Fields of South Africa, a South African mining company--a forty-nine to fifty-one percent arrangement, where they put up the money for the development for the price of being a partner. That operation went into operation some time in 1979, and has been operating ever since. The fluorspar mine--we did not seek a partner for that small mine--started production in the mid 1970s.

Swent: There was one called Aggeneys?

Fenzi: The one at the Black Mountain was. Actually, the Black Mountain deposit was, as I say, in the northwest portion of South Africa--rather remote, approximately a hundred miles north of Cape Town, in a remote, unoccupied area of the country. Not too far from O'okiep, the Newmont mine. It has been a fairly successful venture--depending on the price of lead, and has run--still has a lot of reserves remaining. The fluorspar, which is over, as I say, in the central eastern part of the country, is a much smaller operation--a surface mine with a small treatment plant producing high-grade fluorspar for the steel industry. The main market for fluorspar is steel making. It's been a very successful operation--not very large, but a small moneymaker over the years.

Swent: Was this a decision to get into things other than copper?

Fenzi: Well, it was happenstance; we went out to explore for non-ferrous metals, which include lead, zinc, copper--and fluorspar was a separate thing which we thought might be of some benefit as an extra moneymaker for Phelps Dodge.

Swent: This was quite a departure, to go into another country and different minerals--

Fenzi: Oh, Phelps Dodge has not operated overseas--up until this point, except for in the earlier period when they had a mine in Nacozari, Mexico, which was started in 1900 and operated up until 1950. It was a copper mine, which is about forty miles south of Douglas, in Mexico. Other than that, we had done no exploration overseas. On the other hand, our predecessor companies, some of them, had done the work in Chile back in the 1900 period; they had a holding down in northern Chile when I went to work for Phelps Dodge.

A Property in Chile

Swent: Where were they?

Fenzi: Undeveloped wilderness, which had been found by earlier Phelps Dodge people. And this was a matter of just sideline interests. Mr. Cates sent the chief engineer from Ajo, Mr. Barr, in 1940 down there to look at that property and decide whether to sell it--which they decided to do at that time for a rather small sum. It later became the mine which Cerro de Paseo developed in Chile in the 1960s and was expropriated by the government from Cerro in 1972, when the expropriations of Anaconda and Kennecott mines occurred.

Swent: What was the name of it?

Fenzi: I'll have to look it up and put it in, because I don't remember now. It turned out to be a good mine, but Cerro didn't make any money on it because of the expropriation.

We bowed out of Chile in 1940. And our next venture overseas was when we joined forces with Asarco and others in 1955 in southern Peru. So exploring overseas in the 1970s was a recent and new endeavor to find mines overseas, which has continued our exploration ever since that time. Mr. Pat Ryan shortly after I retired became head of exploration again, and he currently is senior vice president in charge of exploration worldwide.

Woodlawn, A Small Mine in Australia

Swent: What did you find in Australia?

Fenzi: Found a small mine near Canberra, the capital of Australia; a copper/zinc/lead deposit. And that was a joint venture with St. Joe Lead. We had earlier decided to do joint exploration with them, so that St. Joe and ourselves--our exploration people--found this mine, which we later developed in conjunction with an Australian company. That was a very complex ore body, in Australia, not very big reserves, open pit, but small, and had a very complex circuit. So the problem with that one was trying to get a flotation system which adequately separated the three minerals and had to be concentrated--treatable by the smelters that were in the area, in Australia. That was later sold in the early 1980s to the Australian partner.

That was the start of a major exploration activity by Phelps Dodge--and a separate budget which developed over the years; it was increased from time to time, and it's been an ongoing program ever since.

Swent: That was Woodlawn.

Fenzi: Woodlawn. That was the Australian one. Our Australian partner was CRA Ltd.

Exploration in the Safford District, Arizona

Fenzi: One other exploration activity, which took place out at Morenci starting in the early fifties, was the acquisition of property--mining claims over in the Safford district, which was over the mountain from Morenci, some twenty-five miles away. It came to us because it was so close to Morenci; the Morenci geological group were put in charge of that area and exploration programs. Again, we found an area to drill; it was quite a nice showing of oxide mineralization on the surface there in that area. And again, Dick Moolick was there--local geologist at Morenci. He was put in charge of selection of drill sites and so forth. And we drilled out a fairly nice ore body in that location, which was followed up by sinking a shaft to do some experimental work--testing on developing that ore body into an underground mine.

It was quite deep, comparatively speaking, and required underground techniques to extract the ores. So they put Mr. "Skip" Clark, who had worked for us and supervised our uranium operations up in Wyoming--he was brought back to Arizona, and put him in charge of the underground testing of the ore body. He was in charge of sinking a shaft and developing a block of ground to test what mining method would be suitable for that type of rock.

Swent: What method did you choose?

Fenzi: Oh, we never--we were testing a block caving system, and did drill out a block to test. But the economics--subsequent to the time of that period, we were not ready to put the money into a new underground mine in Safford. So it's still there as a potential future reserve and possible mining operation. We continue to acquire properties in and around that area, which are heavily mineralized and we now have a block of ground in that area--just undergoing further study.

Happenstance Underground Leaching at Morenci in the 1930s

Swent: Have you done underground leaching?

Fenzi: We have not done underground leaching; some of our competitor companies have tried it. We did a leaching in this sense: in the Morenci district, after the Depression started and they shut down the underground mine at Morenci, a fire started in the high sulfide ore and pyrite areas of the mine. In putting out the fire with water from the surface we of course got copper sulfate solutions; which started off our initial mine leaching--precipitated with iron--operations; which started in the middle of the Depression in Morenci.

Swent: It was kind of by accident that you were doing it.

Fenzi: And then there was also a fire up in the Coronado mine near Metcalf; it had happened earlier. So we moved the water up there and put water on that, and reclaimed through the old underground tunnel. In both cases, we were able to drain the water out to a outside system of iron-precipitated boxes. And we were therefore producing copper precipitates in Morenci in the middle thirties before they opened up the operation at Morenci again.

Swent: They actually were capturing those--

Fenzi: --those solutions, and treating them with iron and shipping their precipitated copper product to the smelter at Douglas. So we had started leaching somewhat by circumstance, and we learned something about leaching old ore bodies. Later we leached mine waste dumps producing copper precipitates, which continued up until the time we started the S-X operations in the 1980s.

IX OTHER DIRECTORSHIPS AND CIVIC ACTIVITIES

Director, St. Joe Lead Company

Fenzi: In the late 1960s, I was elected a director of St. Joe Lead, an old lead mining company--mines located in Missouri.

Swent: Where was their head office?

Fenzi: Their office was about three blocks down the street from our office in what they call uptown New York. That started my relations with the St. Joe people, who had mines--primarily lead mines--in the Missouri area--

Swent: How had you become acquainted with them?

Fenzi: Well, I don't know. I became acquainted with their top people at various mining events after moving to New York--I had been invited to become a director, and as they're not a competitive metal for Phelps Dodge at that time, they thought it was perfectly proper for me to become a director of another mining company, provided it wasn't mining copper. So I was elected director.

Swent: But had you become--

Fenzi: I presume it was partly because I had met a lot of their people at the Mining Club, at the AIME meeting, and also the Mining Congress. So I became acquainted with their chief executive.

We can go back a little more in history again. Actually, Andrew Fletcher, who was the chief executive of St. Joe Lead for many years--president--he had been chairman of the AIME back in 1950--came to Morenci to visit when he was touring various mining operations with the AIME units; we had one in Morenci. So actually I met Mr. Fletcher in 1950. And Lawrie Riggs, who was, at the time I joined the board, president of

St. Joe, had visited Morenci in 1950 or thereabouts just to visit the property and I had met him at that time.

Swent: What was his first name?

Fenzi: It's a rather hard spelling name: Lawrason, I think. It's a family name. I'd better check that spelling for you.

But when I moved to New York, I became reacquainted with both of these gentlemen, as well as with Mr. Frank Cameron, who was the chairman and chief executive of St. Joe. I think that's why I was invited to join their board, probably. It was a very interesting experience for me; I thoroughly enjoyed it. Field trips to the operations and monthly meetings. They ran a very efficient operation in Missouri, center south portion, south of St. Louis, with a lead smelter on the Mississippi River also. They had an overseas operation in Argentina. My visits to their properties were in the United States until after I retired in January 1981 when I did visit the operation in Argentina. I continued as a St. Joe director until St. Joe was acquired by Fluor in the early 1980s.

St. Joe Compared to Phelps Dodge

Swent: How did the corporation of St. Joe differ from Phelps Dodge?

Fenzi: St. Joe was operated from the New York office. It had a manager in Missouri who was in charge of the Missouri operations; in that sense, very similar to what Phelps Dodge had in Arizona. It had other activities managed in New York; for instance, their relation with their mine in Argentina. They also had a mine in Peru. They also had a worldwide exploration activity; that may have been the reason we had a joint venture with them in Australia, because they wanted to do some looking around Australia.

Swent: Did they have this sort of strong family background that Phelps Dodge did?

Fenzi: Yes, St. Joe was a company similar in some respects to Phelps Dodge. The original company had headquarters in St. Louis, Missouri; had moved to New York with Mr. Andrew Fletcher, who was a New Yorker. Before he got through he had more than fifty years in the mining industry. He was a decisive individual, and very gracious to meet. He ran his company in a somewhat autocratic manner, I thought, but by the time I joined the board, he was the chairman--not the chief executive any longer

--Francis Cameron was president and CEO--but Mr. Fletcher was very influential in decision-making. In the early 1970s, Mr. Lawrason Riggs became president, followed by John Duncan.

Women in Management in the Mining Industry

- Swent: Were there any women on any of these boards then?
- Fenzi: Neither the St. Joe board or the Phelps Dodge board at that time had had any women directors.
- Swent: I noticed that Phelps Dodge has recently elected the first woman to their board.
- Fenzi: There were a number of women in some high levels in the mining industry.
- Swent: Newmont had a woman.
- Fenzi: They had a woman on their board, and--
- Swent: The daughter of the founder.
- Fenzi: Yes, and several of the Canadian boards--one of whom had a--the chief executive was a woman at the time I remember visiting in Canada.
- Swent: Which was that?
- Fenzi: I can't tell you. I remember meeting her; she ran a mining company in Canada. So there were women in the industry at those levels, but not very many.
- Swent: Very few.
- Fenzi: They are starting to have women in the operations.
- Swent: It was pretty much a man's world, in mining.
- Fenzi: In the industry there were a number of women in geology, and some in the government agencies such as the Bureau of Mines, and a few, as I said, were in the mining companies. Phelps Dodge's first hiring of women was during the Second World War.
- Swent: Yes, we had spoken of that.

Fenzi: And there were quite a number hired at that time. But at the end of the war, we no longer-- we told them not to hire any women in the operations part of the business. We did hire people in the office, and started to hire women engineers in the 1960s. But in the early seventies, we started hiring women in the operations again.

To continue about St. Joe--shortly after I retired in 1980, the negotiations for Fluor to acquire St. Joe took place. Fluor was a "white knight" candidate as our northern "friends," Bronfman Brothers, the distillers, made an offer to acquire St. Joe, which triggered the interest in finding somebody, an alternative group. Fluor entered the picture and resulted in the acquisition of St. Joe.

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Fenzi: --St. Joe.

Swent: You didn't continue, then.

Fenzi: Prior to that acquisition, St. Joe had been successful in finding an excellent gold property in Chile, their exploration team.

Swent: What was the name of that?

Fenzi: El Indio. It was in central Chile, and it was developed in the late seventies; Eleanor and I visited there in January 1981 to see the operations, which were just starting up.

Community Activities in Morenci and Clifton

Swent: When you were in New York did you get involved in any civic things at all?

Fenzi: Well, of course in the mining towns, you had to--

Swent: Did you belong to Rotary or any of those things?

Fenzi: Locally, I belonged to Rotary Club in Morenci and Clifton. And, of course, the mining towns were operated by the manager's office. We had rentals and utilities--rental departments.

Swent: Did you get into the school board, or--I think you mentioned that.

Fenzi: I didn't get on the school board.

Swent: No. Scouting, or baseball, or church, or any of those things?

Fenzi: Well, my wife was in the Girl Scouts--Cub Scouts also. We were involved in the social activities of the town--was a Rotarian and a member of the American Legion, as a result of my career in the Navy. Involved in many activities including small church. Had a very small mission, Episcopal church in Morenci. So that was part of our social activities.

The Rye, New York, Planning Commission

Fenzi: Shortly after moving into our new home in Rye, New York, we got involved in a local property development in our neighborhood, so I got active in that and ended up being appointed to the Planning Commission of Rye. I was on that Planning Commission for fifteen years, I guess. Was chairman for a while, for different periods of time, which was quite interesting. It was an active activity; people took city planning very seriously--particularly those in their own neighborhood. It was educational. It took quite a few nights a month to attend meetings.

In the Mining Club, which was a social mining group, I was president for a period of two years in the mid 1970s.

Swent: What about the Copper Club?

Fenzi: Copper club was not a club in the strictest sense a "club." It's a group of people in the copper metal business in New York, which consists of the metal buyers, scrap buyers, refinery people, and traders in metal--scrap, primarily. Phelps Dodge was a member, and I joined as an individual member for about one or two meetings a year, which were held at different hotel banquet rooms. Sometime after it was formed, the Copper Club decided to select a "Copper Man of the Year" with a trophy. It was given to Mr. Page early on; it was started in the early sixties. Later, Mr. Munroe received the annual award from that group.

The Copper Development Organization

Fenzi: Phelps Dodge was one of the founders and I was also a member of the Copper Development organization, which was set up by the copper producers and the copper manufacturers with a view of increasing the interest in using copper products.

Swent: Did you have a staff?

Fenzi: Had a director--he had a staff. And it was an effort to investigate the use of copper--where it could be increased--in the auto industries, in the housing industries, and in the telecommunications industry; any place where copper was being used and might be used.

Swent: And what was your role?

Fenzi: I was a member and went to meetings we would hold on the subject and to an annual three-day meeting usually held at a resort hotel. I never held any offices in that organization, but was on the board. Mr. Page was one of the founders of the organization.

Swent: Phelps Dodge was a contributor to the--

Fenzi: A contributor to support it. It was a corporately supported activity. Various producers were members and supported it, and the various manufacturers were members who were interested in copper products. And they would have an annual meeting and occasional meetings to further advertise the use of copper. Had an advertising campaign which was supported by the organization--in national magazines, and things of that type. And it was effective in certain areas of the automotive industry particularly in connection with the continued use of copper in radiators. In the 1960s some aluminum radiators, rather than copper radiators, were tried by a few companies in the automobile industry; it proved to be unsatisfactory. An aluminum radiator is lighter and cheaper, but it also was subject to much more corrosion problems than a copper radiator. So that substitution did not occur for very long. [long pause]

There's been a major change in New York since I retired, in the sense that a number of mining companies, including Phelps Dodge, have moved their headquarters elsewhere. Other mining companies were merged with oil companies and others. So there are fewer mining people in New York compared to twenty years ago. I think the Mining Club has been closed.

Swent: I think it's closed.

- Fenzi: I think it had to close for lack of membership.
- Swent: I think Simon Strauss told me that it had closed.
- Fenzi: It finally closed. Moved over to the Chemical Club trying to stay alive and finally closed entirely.
- Swent: It's a big change, isn't it?
- Fenzi: There wasn't enough people to use it. The copper development group--it was a different type of thing; it continues because it doesn't matter, really, where you're located. They only have meetings semiannually anyway, as does the Mining Congress, which is very active organization--spokesman for the mining industry--a good many parts of the mining industry.
- Swent: You might tell the little anecdote that you told me about Plato and the Carlin mine plan.
- Fenzi: Well, that was nothing to--it was part of business, kind of, in a way. They were in the same building, so he did ask me to come down to his office and review the mining plans they had just put together for Carlin. I think one of the interesting things about that particular factor was a man that they had--an engineer--who was working then for Newmont. And in this activity, the Carlin mining plan--was an ex-Phelps Dodge engineer who had worked in Morenci in the 1950s as a young engineer just out of college.
- Swent: Who was that?
- Fenzi: Bob Denny. He worked there about five years and then went elsewhere. We had become reacquainted in the early 1960s again; it was interesting to me. So I had a look at the mining plan before they started the operations at Carlin. And it was obvious stripping plans had benefitted from his Morenci experience.
- Swent: Did you think they were all right?
- Fenzi: I did not offer any particular suggestions; maybe one or two small points on the plan. But, of course, I had seen Plato regularly at the Southern Peru meetings because I became a director of Southern Peru after I moved to New York.

Director, Southern Peru Copper Corporation

- Fenzi: We had, I think, two people from Phelps Dodge on the Southern Peru board in the early 1960s, Mr. Page and myself. I stayed on that board until I retired. Mr. Munroe replaced Mr. Page.
- Swent: I guess each of the partners had--
- Fenzi: Each of the partners had representation on the board. Each of the minority partners had two representatives on the board. And of course, Asarco had five or six.
- Swent: And I think there were no other directors who were there--no outside directors.
- Fenzi: No outside directors, no. It was a corporation owned and operated by the four corporate owners.

Serving on the Phelps Dodge Board of Directors

- Swent: Did Phelps Dodge have any outside directors?
- Fenzi: Yes, it did. Mostly outside directors.
- Swent: How do you feel about that?
- Fenzi: I think there is a lot of merit to having a majority of outside directors on the board of a public company. The purpose of directors is to help set the policy for the company, and you like to have a broad base of experience to be more general than just maybe the copper industry's point of view. You need a broader point of view, because the operations were general, not just in one area. So outside directors at Phelps Dodge have been very helpful to the company. At the time I was on the board, there were usually four or five inside directors on the board (and as many as twelve outside directors). There was the man who headed up manufacturing, the man that headed up mining in the West, myself, and the president and/or chairman. It varied from time to time, of course, depending on people retiring and so forth. As time went on they had more committee assignments for directors to act in specific areas.
- Swent: Were the outside directors personal friends of the inside ones?
- Fenzi: Well, they became personal friends.

Swent: But were they before they were selected?

Fenzi: There were some who were obviously people we had met in the business community and felt they would make a good director because you knew them. That was the general tendency in the 1960s when I first joined the board. I think later on it was still people who we met in other areas--who the chief executive had met, or other directors. George Munroe recommended and considered a committee for the selection of directors that was appointed by the board early in the 1970s, and they were all outside directors on that committee. They would make recommendations which were then voted on by all the directors and the stockholders.

Swent: Were they golfing buddies, or--

Fenzi: No, I don't remember that, particularly. They were people high up in their companies--that was one of the criteria: people who were either chief executive or important in their particular company to be eligible to be considered a director for Phelps Dodge. A director is a pretty important individual; he has to take all the responsibility of becoming a director of a public corporation. It's important that he's knowledgeable, at least with what goes on in the general business world both in the economic way and in the political way, whatever. But the directors we had became friends, of course.

In the early 1970s we first appointed a committee of directors to look into the aging question--or how long one should be a director. Once you were elected, you might stay on indefinitely--you had to be elected every year, but the tendency was to reelect you as long as you were interested in being a director. So this committee recommended certain time limits, and they were adopted by the board; seventy-two became the mandatory retirement for an outside director. In the case of insiders, sixty-five, I guess, was the--well, I'll backtrack a little--in the case of myself, sixty-eight would be my retirement age. And then subsequent for other inside directors, sixty-five--when they retired from the company. So that's been followed since that time. In the case of George Munroe, the committee set his retirement age at seventy-two.

Swent: So there are no directors over sixty-five years of age?

Fenzi: No. After adopting the committee's resolution, all outside directors retired at seventy-two.

Swent: I see. And the inside ones all retired at sixty-five.

- Fenzi: Yes. Upon retirement from the company. Of course, that can be changed again by the directors any time. Phelps Dodge elected three of the directors at time who were over the seventy-two period as honorary directors; they were called consulting directors. Two were directors who were well over seventy-two years: at that time Mr. Isaacs and Franz Schneider--who as a matter of fact, lived to be 103 and still was a consulting director for Phelps Dodge and actively attending meetings. Mr. Isaacs died in his nineties. William Rea was elected a consulting director when he reached seventy-two in 1982, but decided to resign from the consulting directorship in the late 1980s. He's still living.
- Swent: Did you enjoy your directorships?
- Fenzi: Yes, I did. It was taking me back to New York once a month for three years--although I feel that I would have, at some point, felt that I'm no longer helpful. After you're actively in business and then retire, you begin to get further and further away from the day-to-day activities. And I feel that the mandatory retirement was probably a good idea because you can't be as helpful on policy making as times change; you get further from active operation of the business. It was about the right period--well, I must say Mr. Schneider and Mr. Isaacs had a lot of common sense and were always helpful with suggestions to the board.
- Swent: What particular strengths do you think you brought to the board?
- Fenzi: I think my main strength was a good engineering knowledge of the business, mining, milling and smelting. I had a general knowledge of copper and the copper market, which I had acquired over twenty years in New York; I had a feeling for what motivated markets in that industry. That was my main contribution to the board.
- Swent: You mentioned your theories of copper.
- Fenzi: Well, that came back to the technology of the industry. I felt that my theories of mining planning and the extraction or exploitation of a given mineral deposit should be related to a long-term rather than a short-term plan, not exploit it too fast.
- Swent: I thought you said that you sometimes differed with Simon Strauss.
- Fenzi: Oh, well, that was a matter of your general feeling about the copper market--what was going to happen in the copper market by

guessing prices and demand. And my views were slightly different than his, whether this would affect the copper market adversely or not affect it adversely, and what in the world economic area--such as whether consumption was going to go up in this area or that area. So I differed I suppose in timing more than in general philosophy. It was an economic model which you are involved with, which goes on all the time; it's very active, and a lot of things affect it. Some was just newspaper talk and rumors, and others, more basic shifts affected it. It's hard to pick out the difference between the two sometimes when you're predicting the future. So I didn't differ with him in the sense of thinking--really, I always thought he was a little bit--he had the economist's view of an economic unit which is fairly rigid in a sense, and there are so many variables that don't respond to a rigid operating model, of an economic situation like copper business. I didn't think that you could be that positive of what this change would do down the road. The only thing I learned after forty years in the business was that you couldn't predict the price of copper very far in the future.

Swent: And yet you have to base business decisions on the prediction.

Fenzi: Yes, had to do it all the time. So what Phelps Dodge did was take a fairly conservative view of the future, of the average price of copper, in drawing up their plans. And they could be criticized at times for being too conservative on their estimate of the price of copper.

Swent: As long as the price turned out better than you estimated.

Fenzi: It usually turned out better, in looking back in time, Phelps Dodge was conservative on their estimate of the price of copper. On the other hand, all of us were a little less conservative--or turned out to be perhaps not conservative enough when some of the inflation hit us in the 1970s. Our costs rose much faster than we had previously experienced and previously estimated, particularly in labor costs tied to the cost-of-living index. I don't know that you can draw any conclusion; just like trying to estimate the stock market. It's no different than that. We all had to estimate, and we all had to live with our estimates, and made plans, and spent money based on those estimates. And, in general, Phelps Dodge had been quite successful with that.

Swent: You didn't get ulcers or headaches?

Fenzi: No, I wasn't given to that particularly; I didn't have that problem. Of course, I took problems home with me at night, but

I didn't have a problem with going to sleep or physical problems with ulcers or anything of that type.

I think two things had affected me: one was my father being killed when I was twenty-one, which made me feel that chance had a lot to do with what happened in the world. And then in the service, again, there were obviously many incidents of chance where people were killed or injured, compared to others alongside. You got kind of fatalistic about things. Although you knew you had to make an effort to deal with problems as best you could with what you had before you to do, you had to be a little fatalistic about whether your decisions were going to be successful or not. Also, I'm an optimistic individual; I tend to look at the bright side of things always. So I always figure the something will come up, turn up to bail you out better than predicted. If you do your homework and make your best effort, you'll probably be successful. So making decisions did not make me pessimistic or give me psychological problems, as I tend to be calm under stress.

X FAMILY

Several Strong Women Widowed Early

Swent: You mentioned--we were talking earlier about the strong women in your background, and you hadn't said anything about your mother's life after your father was killed. She was still a youngish woman.

Fenzi: She was in her early forties. She had not worked--

Swent: With four children to--

Fenzi: No, when my father was killed, I had just graduated from college and had just received an offer of a job with Phelps Dodge. My brother was at the University of California--

Swent: That's Guido.

Fenzi: No, that's Orazio. He was studying mining at the University of California and had another year to go. And my sister--

Swent: What's her name?

Fenzi: Sara Luisa, nicknamed Sara Lu, just graduated from high school.

##

Fenzi: I think she had just started to work as a receptionist for a local doctor in Santa Barbara. She thought she was interested in nursing, which, subsequently, she was, and went to nursing school and so forth. My brother Orazio had found a job with a friend of the family who had a very small gold mine operation near Calistoga, California. And he was working up there at the time my father was killed. And my other brother Guido was twelve.

Great Grandmother, Josephine Wood Warren, Grandmother, Sarah Warren Redfield and Mother, Dorothy Redfield Fenzi

Fenzi: [My great grandmother Josephine Wood Warren was widowed at twenty-two and had a two-year-old baby, Sarah. She had been living in Philadelphia--her husband David Warren was a book publisher, nineteen years older (a second marriage). Josephine was a graduate of Connecticut College in elocution. She was offered a position at Mills College and she had her daughter Sarah moved out there in 1863. She taught elocution until 1868 when she moved back east to Vassar, teaching the same subject. She wrote several textbooks on elocution. She and her daughter traveled by boat and across the Isthmus of Panama by train each time, so she must have been the source of her daughter's and granddaughter's undaunted spirit.]¹

Swent: I met Guido's wife, Jewell.

Fenzi: And my grandmother and mother had been at home with Sara Lu and Guido, the night my father was killed. Orazio had gone to his summer job. My grandmother had been living with my mother and father practically since they were married. My New England grandmother had a bookstore business and supported her daughter, Dorothy, after her husband had died in Clinton, Connecticut, and they moved to Santa Barbara. Before my mother and my father married in 1913, she and my grandmother had a boarding house where they lived in Santa Barbara. And I believe my grandmother stayed there, and continued to run the bookstore and teahouse.

Swent: You said she managed the bookstore for--

Fenzi: When my grandmother, Sarah Warren Redfield, came to Santa Babrara in 1904, she managed a bookstore near the beach for a Mr. Elder of San Francisco. Later in 1909, she bought the bookstore from Mr. Elder and moved uptown, and she later had her daughter helping her in a bookstore and tearoom. They also sold types of porcelain and some manuscripts. The porcelain was Dedham, and crackleware--stone china, American-made. By now it's quite expensive because they stopped making it. Anyway, she had that business, and when her daughter was married I'm sure she continued that business. Later, what I remember after I was born, she managed a bookstore for someone else in the middle twenties until she had high blood pressure and lost the sight in one eye and became partially blind in the other eye. So she had to stop working.

¹Bracketed material was added by Mr. Fenzi during the editing process.

At the time my parents were first married they had a little cottage next to the big house that my other grandmother and grandfather had built up on the hill on Mission Ridge. And they lived there in the cottage--in fact, it was a cottage they put up, I think; one of the early prefabs--where you bought the house and put it together. So from the time they were first married until I was born they lived there, and then when my father's brother and older sister who were still living in Santa Barbara after the parents went back to Italy, moved out. In 1916, his older sister went back to Italy, and his brother--my uncle--also married; he was in the oil business and moved to Fillmore. So then my mother and father moved back into the main house. At that point, my grandmother Redfield came up, I'm sure, to live with them sometime after that. And after that point on, she always lived with us. In fact, as I think I told you earlier, she took care of the three older children when my father and mother went back to help with the Italian grandfather farm concession in North Africa, Libya, in 1925. They were gone for about a year, including the Santa Barbara earthquake of 1925.

After my father was killed in 1937, my mother did not work; she lived on some of the insurance she had received from the accident. Then she realized she would have to go to work--of course, she was well known in Santa Barbara, and she went to work as an assistant manager in the local Lobero Theater, which was a theatrical theater, not a movie theater, where theater companies performed plays and musical recitals--plays came up from Los Angeles, to try out and so forth and so on. Many of the famous actresses and actors of the day performed there. She started out as an assistant, and then the lady who she was assisting retired from it and, some years later, she started--about 1942, I guess--she became the manager of that theater, and she continued until she retired in 1968. She loved the theater. She loved the ability to meet with these people that came up to perform there. So she did that for the rest of her life, living in the old home, which we moved to in 1927, when my father's family house was sold.

Sister Sara Luisa Fenzi

Fenzi: In the meantime, shortly after my sister got the job with the doctor, she then thought she wanted to go into nursing. There was a nursing course at the local cottage hospital, which she entered, at the time of the start of World War II, and she graduated just about as the war ended, as an RN. Subsequently she moved to San Francisco to practice nursing, and there she

took additional courses got her master's degree and after she was married in her late forties, then became a teacher of nursing at Hayward Community College. She stayed there until her husband died; she wasn't married very long. It only lasted, unfortunately, for three years. And he died of cancer --after an operation for cancer--the aftershock of the operation. So she continued to live up there for a short period and then moved down to Santa Barbara and taught nursing at the community college in Santa Barbara until she retired in the early seventies.

Brother Orazio Fenzi, U.C. Mining Engineer

Fenzi: My brother Orazio was in his fourth year of mining at Berkeley, but he did not finish school; he went to work, starting with the job up in Calistoga, in a small gold mine, then went to work subsequently for Phelps Dodge. He joined Phelps Dodge in '39--in Morenci first, then moved to Ajo. He was a chief engineer in Ajo for many years. Later, he was mining superintendent at the Tyrone mine; transferred up there from Ajo, and then retired in Silver City. So he was always in the mining business. He was in World War II for four years with the Army engineers; he went out to the Pacific very early in the war. Went down to New Guinea--started in New Guinea and then came up the whole chain of islands. Finally ended up in the Philippines and at the end of the war was in the Philippines. So he saw a lot of the Pacific campaigns, then returned--well, he didn't want to go back to Ajo; he decided to try something else, so he went to work for Union Carbide at their vanadium mine in Bishop--up in the high country above Bishop--for a while. Early that winter they had a lot of snow. And one afternoon he came out and found his car covered with snow. He decided he would go back to Ajo; he shoveled his car out and drove to Ajo and returned to Phelps Dodge.

Brother Guido Fenzi, U.C., U.S. Department of State

Fenzi: My brother Guido--of course, he had been through the school in Santa Barbara, and went first to Cal Tech. As a freshman he contracted scarlet fever, so he was out for a while, and he decided to change after that and move up here to Berkeley. He finished his career up here in Berkeley in political science. He had this interest in being in the Foreign Service, and met Jewell; she was a student up here also. So they were married

up here and then he made application for the Foreign Service and found a great deal of difficulty because of his scarlet fever; he had a heart murmur. He had a hard time getting accepted, although the doctor he had gone to see said he was perfectly healthy for a Foreign Service career, and he had that special testing and finally was accepted as a Foreign Service Officer in 1956. And that's where he stayed until he retired. So that's the history of the family.

Swent: What an interesting family. An awful lot of young widows, though.

Fenzi: That's right. My mother and, of course, my sister again.

Swent: Your great-grandmother, your grandmother, your mom, and your sister--

Fenzi: And then my sister was widowed after three years of marriage. She was much older.

Swent: That's a sad tradition there. But they coped very well.

Fenzi: The great-grandmother, Josephine Wood Warren, was a friend of Mrs. Eddy [Mary Baker Eddy, the founder of Christian Science]; that started in New England. There are books in the attic that Mrs. Eddy had given my grandmother as a girl, for some birthday or other occasion.

Swent: Was she a Christian Scientist?

Fenzi: I think my great grandmother and my grandmother both were, but my grandmother wasn't when I knew her; she was a very strong Episcopalian then. I think she had been a Christian Scientist, and I think that--

Swent: It's a good philosophy up to a point, I think.

Fenzi: Yes. To cope, and strength of the will is very important. She was a very interesting person, but very black-and-white. This was right, and this was wrong. There wasn't too much gray area in her thinking. Of course, grandparents were very interesting to children--very good to have around. She lived with us, so we knew her very well.

Swent: Now I would assume that your Fenzi grandparents were Roman Catholics.

Fenzi: Yes, Italian Roman Catholic, which is the term. They took their religion pretty casually.

Swent: They had no illusions about--

Fenzi: They wouldn't be anything else, but they were not--they say about my grandmother that she got to church in time for the benediction, and that was early enough. I know my father didn't go to church except perhaps twice a year; he would usually go at Christmas time, and sometimes at Easter time. So he was perfectly happy I guess to have my mother raise us all as Episcopalians. As far as he was concerned. My grandmother Redfield was a very strong churchgoer; it was very important to her whether we were Catholics or not. As you know, New Englanders weren't very favorably disposed towards Catholics, in general.

Swent: That's an interesting, wonderful family.

Fenzi: Very interesting people, and very self-sufficient. My mother was very adventuresome--I think my grandmother must have been, too. Mother loved to fly; I have a picture of her flying in 1913. Lockheed started in Santa Barbara, building seaplanes, and they had a small seaplane service where people could fly from Santa Barbara to see the channel islands and come back--in an open-cockpit plane. There is a picture of my mother with her goggles on in the plane as a passenger and was flying just at the time she was married, when she was nineteen. So then later on, when she was in North Africa, she got to know some of the Italian military personnel that were there. They would take her up in the Italian fighter planes. My father wasn't quite so interested, but she was.

Swent: Thank you very much, Warren, for sharing your recollections.

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